The Academy of Management

JOURNAL

Academy of Management JOURNAL

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In its articles, the *Journal* seeks to publish work that develops, tests, or advances management theory, research, and practice. Articles should have well-articulated and strong theoretical foundations. All types of empirical methods—quantitative, qualitative, or combinations—are acceptable. Exploratory survey research lacking a strong theoretical foundation, methodological studies, replications and extensions of past research, and commentaries with new empirical content are also of interest for publication as research notes if they make an important contribution to knowledge relevant to management. In addition, responses to or comments on articles previously published in the *Journal* may also be appropriate as research notes if they make an independent contribution to the literature.

Articles and research notes should be written so they are understandable and interesting to all members of the Academy. The contributions of specialized research to general management theory and practice should be made evident. Specialized argot and jargon should be translated into terminology in general use within the fields of management. Articles should also be written as concisely as possible without sacrificing meaningfulness or clarity of presentation. To save space, tables should be combined and data should be presented in the text wherever possible.

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Manuscripts submitted for publication as articles should not ordinarily exceed 30 double-spaced typewritten pages, including tables. Manuscripts submitted as research notes should not exceed 20 double-spaced typewritten pages, including tables. Everything in submitted manuscripts should be typed in double-spaced format in a 12-pitch or larger font. Please consult the "Style Guide for Authors" for further details of manuscript preparation.

Decisions regarding the publication of submitted manuscripts are based on the recommendation of members of the *Journal*'s editorial board or that of other qualified reviewers. All articles and research notes published in the *Journal* are subject to a blind review process. Obvious self-citations that make known an author's identity should be avoided whenever possible. Reviewers evaluate manuscripts on their significance to the field, conceptual adequacy, technical adequacy, appropriateness of content, and clarity of presentation. Reviewers' comments are made available to authors.

Submissions should be sent to Anne S. Tsui, Editor, % Carolyn Haitsch, Managing Editor, *Academy of Management Journal,* Pace University, 86 Bedford Rd., Pleasantville, NY, 10570-2799.

Academy of Management
JOURNAL

CONTENTS
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FROM THE EDITOR

This issue marks the beginning of my editorship and the 40th anniversary of the *Academy of Management Journal*. Over the past 39 years, *AMJ* has developed into a most important and widely respected scholarly journal that publishes high-quality management research in a variety of areas. Maintaining the excellent reputation and the extremely high standards that have been set by my predecessors will be a tall order, a challenge that I am honored to accept. I wish to thank the Nomination Committee, chaired by Mike Hitt, and the Board of Governors, presided over by Rick Mowday, for their confidence in my ability to be this journal's shepherd for the next 3 years. Also, I thank Yuk-Shee Chan, the Dean of the Business School at the Hong Kong University of Science and Technology, for his support; by accepting this assignment, I must forego many responsibilities within the university. To all of you, I pledge to do my absolute best to meet the expectations of the Board, *AMJ* authors, *AMJ* readers, and members of the Academy at large.

Two Major Changes at *AMJ*

I am the first *AMJ* editor to work in a university outside North America. As I write this statement from my office in Hong Kong, I am reminded of the bold step the Board of Governors took in entrusting *AMJ* to someone so far away — over 7,000 miles from most of the *Journal*'s authors and reviewers. I applaud the Board for this significant action. I also applaud them for creating the role of associate editor, an innovation that was much needed, given the volume of manuscripts and the diversity of topics published in *AMJ*. These two changes mark a major step forward in ensuring that the *Academy of Management Journal* continues to provide high-quality service to authors, readers, and the Academy's members—a level of service that I believe is unmatched by our competitors.

New Associate Editors

The *Academy of Management Journal* has had basically the same editorial structure since its inception in 1958: one editor who made all editorial decisions, three to four consulting editors (a role introduced by Jan Beyer), and an editorial board of about 60 reviewers (fewer in earlier years). Over the past few years, submissions to *AMJ* have been increasing; we now receive over 500 new manuscripts annually. With this increase in volume has come a greater diversity of topics. Therefore, when the associate editor idea came along, it made sense. In the new structure, two associate editors help to address the breadth of knowledge represented by the submissions. Each serves as acting editor for some submissions and makes final editorial decisions on those manuscripts. Angelo DeNisi chaired a task force and successfully recommended this struc-

ture to the Board of Governors. The two new associate editors, Rita Kosnik and Gregory Northcraft, are highly respected scholars in their fields. They are conscientious and committed to serving *AMJ*, and we share the same values regarding our role vis-à-vis the authors and reviewers. Common values and the same level of dedication are critical to ensure consistency in our service to authors and fairness in our editorial decisions. We work as a team, with no one person more important than the others. We have worked together for almost six months. They are more than good, they are excellent. Either of them could step in and take over the editorship today. Thank you, Rita and Greg, for your willingness to serve. I look forward to our partnership over the next 3 years.

A New Manuscript Flow Process

How does my being in Hong Kong and the involvement of two associate editors affect the manuscript flow process? Early on, I decided that the changes should not impose any inconvenience on authors and reviewers. So I chose the Academy of Management headquarters (Briarcliff Manor, New York) as the location for the *Journal*'s main office; it seemed appropriate, since the United States is where the majority of the authors and reviewers work and reside. All the correspondence with authors and reviewers comes from (and should be sent to) the New York office. The basic review process is as follows: Each week, the newly received manuscripts are express-mailed to Hong Kong from New York. I assign reviewers and an acting editor (Rita, Greg, or myself) to each manuscript, and communicate the information to New York via electronic mail. The managing editor (Carolyn Haitsch) sends the manuscripts to the assigned reviewers and acting editor, and the reviewers are instructed to fax a copy of their review to the acting editor. Through this process (and thank goodness for electronic mail and fax machines), we should be (and have been) able to maintain the same level of timely turnaround as was achieved in the past by my predecessors.

The Editorial Staff

In addition to two great associate editors, I am assisted by an excellent managing editor, Carolyn Haitsch, in New York, and a capable editorial assistant, Venus Lee, in Hong Kong. Carolyn has had several years of editorial experience and worked as an independent consultant before she joined us. Venus is a new college graduate who is eager to learn and has lots of creative ideas on how to make things work better. Steve Gomes, the critical link between an accepted manuscript and a published article, served as *AMJ*'s production editor for 10 years and (despite my pleading) has decided to move on to other challenges. We thank him for his excellent service to *AMJ* and wish him well in his new endeavors. Persephone Doliner has done an excellent job as the *Journal*'s copy editor and has agreed to continue in this role. She has kindly agreed to take over the production editor position as well. Last but not least, Dan McAllister will be the new index editor, succeeding Martha Sanders. The *Journal* cannot function without the committed service of every member of editorial staff. The entire staff is ready and eager to serve our authors and readers.

The Editorial Review Board

Although the editorial staff is important for the production function, the editorial review board is critical for the intellectual content of the *Journal*. In selecting the board members, my two associate editors and I placed a great deal of emphasis on the reviewers' past performance. We wanted not only scholars at the tops of their fields, scholars with the highest academic standards, but also people who shared one of the core values of the *Academy of Management Journal*—to make the review process helpful and developmental for our authors. The editorial board that you see on the masthead comprises individuals who have demonstrated their commitment to this goal through their past service to the *Journal*, either as review board members or as ad hoc reviewers for Angelo and previous editors. I thank them for their willingness to continue the tradition of timely and constructive reviews during my tenure. Through the good work of all previous editors and reviewers, *AMJ* has established an excellent reputation for timely reviews. With the help of our reviewers, who are critical to our success, my associate editors and I intend to maintain this important tradition.

The Importance of Ad Hoc Reviewers

Given the high volume of submitted manuscripts and their diversity, the editorial board alone cannot meet all of our reviewing needs. Therefore, the board is supplemented by a pool of ad hoc reviewers; at least one ad hoc is used for each manuscript. We have well over 500 ad hoc reviewers ready to serve *AMJ;* we could not succeed without them. About half of my initial editorial board members were ad hoc reviewers for Angelo. I plan to make additional appointments to the board as I gain a better understanding of the flow of manuscripts.

Special Thanks to Angelo DeNisi

We now have had about six months of experience with the new manuscript flow process and the new editorial structure. It has worked well, due largely to the untiring help and counsel of Angelo DeNisi and his managing editor, Estelle Scaiano. They both have been patient, supportive, and understanding throughout the transition period (which began in early 1996). I am particularly fortunate to follow Angelo, who has not only maintained the intellectual rigor of the research published during his term but has also opened the *Journal* to alternative paradigms and to work that is less traditional than we have seen in the past. Angelo has helped make *AMJ* more interesting, diverse, and stimulating. And, among other things, he will be remembered for his active role in successfully advocating the associate editor idea.

Message to Authors

You are the heart and soul of the *Academy of Management Journal*. It is your ideas and work that make the *Journal* a vital resource for students and scholars of management. I would like to clarify a few key points for you:

First, we invite you to submit your *best* work to *AMJ*. We recognize that we have many fine competitors, but we would like *AMJ* to be your journal of choice. We aspire to publish the best work, and we can succeed only if you send us your best papers. Many of our international members have told us, directly and indirectly, that *AMJ* is not open to non–North American research styles. I recognize that *AMJ* serves a diverse set of authors and readers. Therefore, during my tenure as editor, I intend to publish a diversity of papers in *AMJ*, especially those by members of divisions that have not yet had much coverage in this journal. We have already seen an increasing number of nontraditional papers published in recent years, and the special research forums have helped to stimulate new topics and new ideas. However, I would like to see even more diversity—more than ever before. But keep in mind, we can only publish papers that are sent to us.

Second, we want to publish papers that can be read and understood by *AMJ*'s diverse audience. If you think that a study has relevance for general management and is potentially interesting to the general *AMJ* audience, it is important that you demonstrate this in your manuscript. You need to present your research in a way that allows scholars outside of your specialized area to understand your ideas and data. In the same vein, please avoid using specialized terminology that would not communicate your ideas, logic, arguments, and procedures effectively to a broad audience. Ask a colleague or two (outside of your area) to assess your manuscript for clarity. In fact, all manuscripts should be read and critiqued by colleagues before submission. Premature submission is the downfall of many otherwise acceptable papers.

Third, we need your help in enforcing the *Academy of Management Journal*'s double-blind review policy. This practice is important to ensure objectivity in the review process and to maintain high-quality reviews. Knowledge of a manuscript's authorship inevitably introduces bias— positive or negative—into the review process (and slows the process down). You can help by avoiding the use of obvious self-citations. If you must refer to your previous work because it serves as the foundation for your current effort, use self-citations judiciously.

In return, we, the editorial team, the editorial board, and the editorial staff, will try our best to provide you with timely and constructive feedback. Though we are not able to publish every paper submitted to the *Academy of Management Journal*, we will try to make the review process itself a valuable learning experience for all of you.

In summary, it is my duty and responsibility to continue the excellent traditions and accomplishments achieved by my predecessors at *AMJ*. My two associate editors and I have a common heart about our roles. We are committed to publishing the best available research in the field of management, and we will do our very best to achieve this goal.

Anne S. Tsui
Hong Kong

NAVIGATING BY ATTIRE: THE USE OF DRESS BY FEMALE ADMINISTRATIVE EMPLOYEES

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We conducted an inductive study of the everyday decisions about dress at work of female administrative employees in a university business school. Our findings reveal that dress is an attribute embedded in a variety of cognitive schemata that govern individuals' comprehension of and behavior at work. In acquiring and executing these schemata, employees make efforts that enhance their emotional preparedness for jobs and improve interpersonal relations. The study offers implications for theory and research on organizational symbolism, role taking, and the current practical trend toward relaxed dress.

Mom, change those clothes. I hate it when you wear a suit at home. It's like you're not really here.
                                        A six-year-old child to his mother

In the daily process of choosing the clothes that they wear to work, many people may forget that the choice and wearing of business dress is a performance in the sense suggested by Goffman (1959): a behavior that individuals purposefully use to convey information about themselves to others, enabling them to engage in social interactions and place themselves in social systems. In this article, we explore individuals' use of dress as part of their role performance. Following the performance metaphor, we take a backstage look at the thoughts, feelings, and behaviors of female administrative employees in an academic organization as they relate to dress. Our specific focus is on dress at the individual level of analysis, that is, on dress as a symbol that individuals actively use to facilitate their performance of organizational roles (Rafaeli & Pratt, 1993; Trice & Beyer, 1993).

THEORETICAL FRAMEWORK

Roles are the sets of expectations and activities that guide and govern individual behavior both in and out of organizations (Katz & Kahn, 1978). Role performance involves both fulfilling the expectations of others and shaping others' expectations (Graen & Scandura, 1987). According to role theory, roles structure the work of an organization (Graen, 1976; Katz & Kahn, 1978; Myers, 1994). Individuals are said to "take" roles by performing the necessary activities and accepting the relevant expectations that are "sent" by others. Hence, the process of role taking involves reading cues from others and reacting to the expectations these cues signal.

Relatively little research has explored how individuals accomplish role taking. Our study focused on how individuals engage symbols in the process of role taking. Symbols, which can be defined as "concrete indicators of abstract values" (Firth, 1973: 54), are a part of cognitive frameworks, or templates, known as schemata. Schemata are sets of cognitions about people, roles, or events that govern social behavior (Fiske & Taylor, 1984; Taylor & Crocker, 1981). Our basic assertion is that individuals use dress as a symbol to engage and execute their role schemata in organizations. Because symbols are typically concrete and visible, they are accessible to employees seeking to manage their role behavior. Our study will show that individuals include knowledge about symbols such as dress in the schemata they apply to their organizations, their roles in organizations, and specific events within these roles. Individuals' knowledge of dress as a role symbol is elaborate and structured; this dress knowledge is useful in role taking. We found that study participants used dress as an informative role symbol for engaging their work roles, executing role activities, calling up role feelings, and affecting how they as role performers related to others.

Researchers investigating symbols in organizations have paid only limited attention to individuals' use of symbols in role performance. Instead, research has primarily focused either on symbols as tools that managers use to create or "enact" an organizational reality (e.g., Pfeffer, 1981) or on symbols as indicators of various organizational meanings (cf. Gagliardi, 1992; Schultz, 1994; Trice & Beyer, 1993). Neither interpretation greatly aids understanding of how employees use symbols in their everyday activities. Yet symbols provide individuals with a means of communicating with others in an organization, because they connote important organizational and social values.

Dress as a symbol has received extensive popular attention, as exemplified by the "dress for success" books (e.g., Molloy, 1977), as well as some limited attention in the organizational literature (Rafaeli & Pratt, 1993). To date, organizational scholars have looked at the dress behaviors of employees from two perspectives. One perspective focuses on dress as a meaningful, expressive symbol associated with an individual's occupational or organizational identity (Trice & Beyer, 1993). Research in this stream construes dress as a cultural form that signifies meanings for a particular social group. In this

view, nurses and doctors wear white or scrubs to communicate to themselves and to others the values and capabilities of the medical profession (Becker, Geer, Hughes, & Strauss, 1961; Pratt & Rafaeli, 1994).

A second treatment of dress in organizations examines the patterns and significance of dress as a macro, organization-level variable. For example, Rafaeli and Pratt (1993) explored how organizational dress patterns relate to aspects of organizational effectiveness. They argued that extraorganizational factors (such as societal and institutional influences) and intraorganizational factors (such as organizational values and structure) shape the content, homogeneity, and conspicuousness of employees' dress. They also suggested that these collective dress attributes affect both individual-level outcomes (e.g., compliance and legitimization) and organization-level outcomes (e.g., organizational image and human resource utilization). Neither of these perspectives grants the individual much autonomy in dress choice or embraces individuals' own perceptions of the dress they wear. Hence, in this study we balanced the existing macro view on dress and symbols in organizations with a microexamination of how individuals used dress in an organizational setting. We did so by studying the dress behaviors of women in administrative or support staff positions in a business school.

STUDYING FEMALE ADMINISTRATIVE SUPPORT STAFF

The organizational literature has paid only scant attention to support staff, yet in most organizational settings, this group is essential to the ongoing functioning and success of an organization (Kanter, 1977; O'Leary & Ickovics, 1990). Some scholars have argued that ignorance of this segment of organizational life is related to the facts that it is typically occupied by women (O'Leary & Ickovics, 1990) and that it is a relatively powerless segment (Kanter, 1977).

Theoretically, this population serves important functions. These employees fulfill boundary-spanning and service roles in organizations; these roles are particularly important for organizations, such as university business schools, that experience demands from two often conflicting environments: education and business. Although scholars have explored the process by which organizations deal with environments marked by conflicting demands from different groups (D'Aunno, Sutton, & Price, 1991; Meyer, Scott, & Strang, 1987; Powell, 1987), there is little work on how this type of context influences individuals' everyday behaviors. When an organizational context comprises competing or conflicting demands, the demands faced by individual employees in boundary-spanning positions are also likely to be complex. Many of these boundary-spanning employees are likely to deal with different sets of clients (in the business school setting, students, faculty, and business executives), and they are likely to operate in two normative contexts (the university and the business community). The extent of such con-

flicts may vary among different employees, but the general sense of competing environmental demands is likely to be evident to all organizational members.

Our study sheds light on how employees embedded in such a work context navigate among the various and multiple demands that their roles embody. In particular, we focused on how individuals integrate everyday symbols, such as dress, into the multiple cognitive frameworks, or schemata, they employ for the effective execution of their roles. We suggest that understanding how individuals creatively use simple symbols, such as dress, to navigate the complexity of their work demands can contribute to understanding the process of effective role execution. Specifically, we show how dress is woven into important schemata (namely, membership, function, hierarchy, and event schemata) that govern individual behavior at work.

Dress as a symbol may have been particularly important to the employees in our study because of gender differences in attitudes toward dress. The participants in our study were primarily women. Women are argued to be more sensitive to issues of dress and appearance and to have a more elaborate dress code than men (cf. Davis, 1992; Malandro, Barker, & Barker, 1989; Shim & Bickle, 1994; Wolf, 1991). Scholars studying women in organizations have typically argued that dress and appearance are more important to women than to men (Kanter, 1977; Sheppard, 1992), in part because women in male-dominated organizations have a greater need for the legitimacy, credibility, acceptance, and self-confidence that dress can convey.

Wolf (1991: 27) described how women's efforts to participate in the world of work are governed by what she called "professional beauty requirements." Wolf contended that women who want to be successful in organizations must look attractive to gain visibility in a male-dominated business culture, but must also not appear too feminine because then they may be perceived as sexual objects instead of as professionals. Thus, Wolf argued, working women must be very sensitive to issues of appearance. Similarly, Sheppard (1992) asserted that women in organizations struggle with reconciling contradictory societal demands to "be feminine" with organizational demands to "be business-like." Neither of these scholars examined how individual women determine their appearance on a daily basis or explored the dynamics that accompany this seemingly mundane microlevel behavior.

Our study therefore examined the recurring dress decisions made by a group of individuals for whom this decision was particularly salient. We intentionally set out to study the dress behaviors of employees who were not constrained by a formal organizational dress code. Our assumption was that these employees would teach us about how dress discretion can be used to express individuality. Our research was exploratory and therefore employed qualitative and inductive methods (Glaser & Strauss, 1967; Ragin, 1994). In conducting our inquiry, we first endeavored to uncover patterns in employees' perceptions of their dressing behavior. These patterns were then used as the foundation for a more informed conceptual understanding of what drives individuals' uses of the dress symbol.

METHODS

The Organizational Context

We conducted this study at a school of business administration in a large midwestern university. The business school offers undergraduate, master's, and doctoral programs, maintaining an enrollment of approximately 2,500 students. It employs 138 faculty members and 137 support staffers. At the time of the study, approximately 16 percent of the full-time faculty members were women, as were 94 percent of the staff and 30 percent of the master's of business administration (M.B.A.) students. The school maintains active relations with both other parts of the university and the business community at large, the latter primarily through student placement and executive education programs.

The Research Team

The research team consisted of four women: a professor and a doctoral student from the business school and a professor and a doctoral student from the psychology department of the same university. This mix was intentional; it was guided by the assumption that a combination of insiders, outsiders, superiors, and subordinates would help unravel the unique dynamics of individual dress in the context on which we focused (Louis & Bartunek, 1992). We sought a research team that would offer easy and immediate access to the members of the organization but have the benefit of an outsider position (Louis & Bartunek, 1992: 105). All team members participated in conceptualizing the project and in collecting and analyzing the data.

Our focus on a small, "purposive" sample of women (Stewart, 1990) who were employed in an organization with which we had personal experience provided our qualitative exploratory study with two advantages. First, we were committed to developing and maintaining a relationship of trust that encouraged mutual sharing of information between participants and researchers. Second, our familiarity with the organizational context helped us interpret the meaning of participants' descriptions.

Data Collection and Sample

We collected data during the spring and winter of 1991. We operated in two parallel modes: (1) Through interviews, we collected in-depth data about the perceptions of everyday dress of a sample of administrative employees and (2) through unobtrusive observations, we collected data about the dress behaviors of organization members, including but not limited to participants. To gain insight into employees' dress, we collected data both on how individuals thought and felt about dress in the organization and on how they actually dressed.

First, we identified a stratified random sample of 20 people from the population of full-time, permanent administrative employees in the organ-

ization. We stratified the sample by functional unit and level.[1] Participants held positions ranging from nonmanagerial jobs (e.g., 11 held clerical jobs) to managerial jobs (there were 3 directors and 6 professional administrators, a total of 9 managerial participants). They came from a wide range of departments, including the library (2 individuals), the dean's office and business relations (2), faculty support (5), student admissions and services (4), placement services (1), computing services (1), document processing (2), and executive education (3). Participants' tenure ranged from 1 to 24 years, with an average of 9 years. Average tenure in the present position was 4 years, ranging from three months to 11 years. Eighteen of the 20 participants were white, reflecting the racial composition of the staff, 90 percent of whose members were white. We established our initial sample size using a criterion of interviewing at least 2 administrative or clerical employees in each of the functional areas identified above and at least 3 of the 11 managerial employees. We evaluated our data after completing interviews with the 20 individuals selected and concluded that, because we had reached theoretical saturation (Glaser & Strauss, 1967), no additional interviews were necessary.

Semistructured interviews. We conducted in-depth, semistructured interviews with 20 female and 3 male administrators.[2] To generate rapport between us and participants, the head administrator notified all the administrative employees in the school that we were conducting a study. We personally contacted the selected employees and asked for their consent to be interviewed. Everyone we contacted agreed to participate. Interviews took place in participants' offices or in a school lounge and lasted between 45 minutes and three hours. We recorded and transcribed all but two interviews; 1 participant refused to be taped, and the tape recorder malfunctioned during another interview. For interviews not taped, we recorded detailed notes. We assured all participants that their responses would remain confidential and anonymous and hired an outside contractor to transcribe the interviews.

The interview focused on how individuals conceptualized and understood the clothing they wore to work. The interview process started by our familiarizing participants with the questions we would ask. The Appendix gives all interview questions. Our goal at the beginning of the study was to acquire a broad understanding of individual dress behavior. We did not set out to study a link between dress and cognitive schemata, although this link emerged from our data. Hence, we asked participants to describe and explain the clothing they chose to wear to work, to discuss when and why they felt

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[1] The original sample included 20 women and 3 men, a distribution that matched the high proportion of women in the school's administrative support staff (94 percent female). Because the number of men was so small, we decided to focus the data analysis only on the women; hence, the interviews with male participants were dropped. This homogeneity of the sample with respect to gender constrains the generalizability of our findings. However, this homogeneity is consistent with our goal of advancing theoretical knowledge of administrative support staffs, which tend to be mostly women (O'Leary & Ickovics, 1990).

[2] As noted, interviews with the 3 men were dropped from the present analysis.

comfortable or uncomfortable about their dress at work, what they thought their dress communicated about them, and to consider how their experiences in the business school influenced their dress choices. As the participants answered these questions, we probed for elaboration and clarification of the answers.

We chose to gather data though semistructured interviews for two important reasons. First, this open-ended format could generate broad, rich information about how participants thought about a process (dressing for work) that is rarely discussed. Second, this format offered us an opportunity to pursue novel responses, to probe for greater depth, and to confirm our understanding of a participant's point of view. In other words, the format was assumed to be a useful vehicle for theory development. This open-ended data collection strategy generated rich data about individual participants' "dress knowledge."[3]

Unstructured observations. We also collected three types of observational data about dress behavior and dress context. First, we took detailed notes that described the dress and appearance of our participants, their co-workers, their workstations, and the interview location. The following is an excerpt from these notes:

> She is somewhat short and slim. She has straight blond hair pulled back with a red barrette into a ponytail. She is wearing red plastic eyeglasses. She is wearing a three-piece outfit in a silky material, probably rayon. Although the pieces coordinate, they are not a suit. Her blouse is black, her skirt is red knit, and her long-sleeved jacket is red-and-black flowered print. She is wearing large black earrings, dark hose, and shiny black shoes.

Second, during the course of the study, we attended various events we thought might help us appreciate the dress context in which these employees operated. The events included (1) an annual administrative staff luncheon hosted by the dean, (2) two talks given by visitors to the school that were planned and managed by administrative staffers, and (3) two workshops arranged by the school. One workshop was planned to assist students in preparing for job interviews; another workshop was intended to help the staff provide effective internal service.

Detailed notes were recorded immediately after each event. The descriptions addressed various aspects of these events, including but not limited to the general appearance and behavior of the event's participants, the appearance of the context (e.g., room decoration, light, sound and noise levels, etc.), and the content communicated. The focus of the observations was on an

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[3] Had we begun this research with the explicit intent of evaluating the place of dress knowledge in participants' schemata, we might have used more focused techniques, such as the repertory grid (e.g., Reger, 1990), to uncover the structure and content of participants' schemata. However, open-ended interviews appear to have been effective for generating descriptive information about cognitive schemata and the content of these schemata (cf. Isabella, 1990; Lurigio & Carroll, 1985; Walsh, 1995).

event as a whole, rather than on any one individual. For example, at the dean's luncheon we noted this:

> One staff member in a two-piece flowered dress was wearing a real flower in her hair, tucked behind her ear . . . . Another staff member was wearing a tight black dress with frills and lace at the top, and high heels. In general, people appeared more dressed up than usual.

At these events we were incognito participant observers, in the sense that we acted like the other attendants. The group was always large enough so that no one knew everyone present; hence, our presence was not surprising or disturbing.

Third, we took detailed notes on the physical attributes and layout of the school. Each member of the research team was assigned a distinct part of the school. She then visited the location and took notes about what she saw. These notes detailed the physical context (walls, floors, windows, arrangement of furniture, and the furniture itself).[4] Descriptions of people and the manner in which they were dressed were included since the people were a part of the context. An excerpt from these notes illustrates the types of details that were noted:

> All of the wood on the doors and edges is natural, with a simple light coating of varnish. The ceiling is made of steel or chrome-looking gray and shiny bars (the ceiling strikes me as very male and military-like). They bestow the place with an official, efficient but cold feeling. The adornments on the walls are pictures of the various graduating classes from 1926 to 1945. The pictures are somber, serious and in black and white, noticeably dominated by men.

Documents. We acquired and scanned documents we thought might prove relevant to the dress or cognitions of the administrative staff members, including formal school policies, training manuals, and internal newspaper articles pertaining to dress in the business school.

Analysis of the Data

We followed the suggestions of Glaser and Strauss (1967), Miles (1984), and Strauss and Corbin (1990) by analyzing the data in three distinct, though tightly interrelated, phases.

Phase 1: Searching for themes. First, we scanned all the data and searched for dominant themes. Potential themes were discussed during weekly meetings. We identified approximately 40 themes, which ranged from what appeared to be intuitive assertions (e.g., dress is used to form a first impression and dress is influenced by weather) to more intriguing,

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[4] This information was collected because we thought that it would help us understand the dress perceptions and behavior of our participants. In the process of data analysis these data proved to be useful mostly in helping us understand the texture of the place, rather than in providing conceptual insights. However, this texture was important background for our empirical findings.

unanticipated themes (e.g., individuals identify differences in dress in different parts of the organization, and dress is used to convey trust and knowledge to clients and vendors).

Phase 2: Developing a coherent conceptual framework. Next, we searched for a conceptual structure that would integrate these themes in a coherent manner. Our goal was to articulate a parsimonious framework that would help us understand and describe some of the dynamics associated with our sample. We were not concerned with fitting all the themes into one framework, because we assumed that dress is associated with a multiplicity of issues. Rather, we sought a framework that would aptly represent many themes and would offer new insights.

Three questions guided our assessment of alternative conceptual frameworks: (1) Does the framework capture a large number of themes? (2) Is the framework a cohesive and parsimonious summary of the themes? and (3) Does the framework offer new conceptual insights about organizational dress or administrative employees? We concluded that for the group we studied, organizational dress is an effortful engagement of a symbol that is guided by dress attributes that are part of several organizational schemata.

Phase 3: Coding data into themes. Using our conceptual framework, we systematically coded and categorized the data according to the themes retained in phase 2. Our coding followed Holsti's (1969) and Rosengren's (1981) recommendations for content analyses. The remainder of this article draws from this database and describes our conceptual framework.

FINDINGS

Three sets of findings capture the process by which our participants used dress to facilitate the execution of their roles. First, they acquired complex knowledge about dress in the organization. Dress appeared to be a component of the schemata that organized participants' ideas about performing various organizational roles—schemata for organizational membership, functional area membership, and hierarchical level membership, and for participation in organizational events. This knowledge influenced individuals' behavior by guiding them to dress appropriately for work, as is summarized in Table 1.

Second, dressing in accordance with these schemata was a means for enhancing competent role execution. Dressing in accordance with the dress attributes that were a part of these organizational schemata helped participants feel right for their roles and helped them maintain effective interactions necessary for their role execution. Appropriate dress cues enhanced role execution, and inappropriate dress cues were construed as role discrepant and as hampering role performance.

Third, dressing in accordance with these schemata involved a surprising amount of work. Work was involved both in learning the dress attributes of membership, hierarchical level, functional area, and event schemata, and in acting them out. Acting out the schemata involved planning and acquiring

TABLE 1
Dress Attributes in Employees' Knowledge of Organizational Schemata

Schema Type	Dress Attributes	Illustrative Quotes from the Data
Organizational membership	*Professional:* Business-like dress components Matched dress components No feminine or sexually provocative dress No jeans, shorts, or dirty clothes	I have two totally different sets of clothes—work and home. I can't wear my Laura Ashley dresses to work. People don't recognize that look as an eclectic taste. I'd feel too silly. It just doesn't fit.
Organizational hierarchical level	*Top levels (management):* More professional components *Lower levels (clerical):* Less professional components	I have to tell people no sometimes. I have to act my authority. Dressing up is part of my job. If I were a manager I'd probably wear suits. It's just not necessary at my level.
Functional area	*Executive education, public relations:* Most conservative dress *Dean's office, placement, library office:* Moderately conservative dress *Faculty support:* Less conservative dress *Document processing:* Least conservative dress	They dress up much more over in executive education. We don't need to do that here in document processing. As a faculty secretary I don't really have to dress up like they do in the dean's office or student placement center.
Role events	*Special events (conferences, meetings):* Most conservative dress *Routine work (typing, phone answering):* Least conservative dress	I write down in my calendar if there's a special meeting in the office, and then I try to dress up more. I had a big meeting today. That's why I'm dressed up. If I'm just coming in to answer the phone and do the usual, I don't worry as much.

dress consistent with the schemata and developing the skills and knowledge necessary for executing the schemata. Individuals reported that they invested significant effort in trying to "dress appropriately" (see Table 2). We elaborate these findings in the remainder of the article.

Dress Knowledge as Part of a Schema

The dress knowledge displayed in the interview responses was rich and complex. As participants talked about their dress at work and about when they felt comfortable and uncomfortable in their dress, they also talked about what they thought their dress communicated about them. Coupled with the detailed descriptions were explanations and rationales for the dress choices. It is these attributions and explanations that we term participants' "dress knowledge." We argue that this rich and complex set of responses is part of the participants' broader organizational knowledge.

Descriptions of dress typically included both attributes (e.g., "blue," or "plaid") and various relationships among these attributes (e.g., "color-matched" or "a conservative look"). For example, one participant, an admissions counselor, described her outfit as follows:

> I'm wearing a rather conservative, tailored suit that is a slightly subdued plaid pattern, in grayish tones with a tan silk blouse that pulls out one of the colors in the plaid, and my gold brooch or lapel pin, which I like because it is so elegant and unique. It is a more business look, all color coordinated. My hose is a smoky-gray, and I'm wearing gray calfskin pumps.

In addition to knowledge about their own dress, participants conveyed knowledge about the dress of others within and outside the organization. This knowledge was important for defining their own dress choices and rationales. Consider these comments from a receptionist:

> The other two people in my position who sit out front here, we all pretty much dress similarly—a bit more than casual but not quite business attire. The three [admissions] counselors always dress in suits and that's just because they are more or less at the supervisory level . . . . I think that if I dress casually, people get the idea that they should feel comfortable to come into the office. Whereas, people up in the placement office, even the receptionists, always wear suits. But up there they deal more with the corporate world than we do.

As participants described and explained their own dress, they regularly referred to the dress of other organization members and nonmembers and contrasted the attributes of their own dress to those of the others. They also related their descriptions of their dress to their roles, functions, and clients. To illustrate, while explaining why she chose to dress as she did, a receptionist in the admissions and student services office offered:

> I'm in a skirt and a short-sleeved sweater. In my position, I don't want to dress too nice because students will come in wearing their slacks and jeans and I don't ever want to give them the impression that I am superior over them. I want to look like I am

TABLE 2
Dress and Role Performance

Conceptual Category	Conceptual Assertion	Illustrative Quotes from the Data
Appropriate dress and shedding nonorganizational roles	Dress helps people enter the role of employee and distinguish it from other, nonorganizational roles.	If I plan to go out with friends after work, I bring along a special set of clothes. As soon as I get home I change into something more comfortable. Like jeans.
Appropriate dress and emotional states	Employees select dress that helps them feel right for the role, which involves	It's all so related. . . . how I dress and how I feel about my work.
Dress and psychological comfort	. . . feeling comfortable	I have to dress so that I am comfortable, so that I can forget about it and not think about it all day.
Dress and social confidence	. . . feeling self-confident.	If I'm wearing something new, and people tell me how nice I look, I feel so much better, like I can go out and do it!
Appropriate dress and relationships	Employees select dress that helps them relate to others by either	
Dress and employees' status in relationship to others	. . . asserting their status with respect to others or	I want my dress to signal that I am someone with authority, so that my "no" is a "no!"
Dress and employees' rapport with others	. . . establishing rapport with others.	[I dress so that] the impression I give to somebody who didn't know me is that . . . I'm going to care about them and that they can trust me to do something for them.

> kind of at their own level, so they aren't intimidated and so they
> will use our office as a resource. If I sat behind my desk in a suit
> and a shirt with a bow tie or scarf around my neck, I think that
> would intimidate some of the students so that they wouldn't feel
> comfortable to come in.

Thus, participants' dress knowledge encompassed not only their own dress but the dress of various groups of others. And dress knowledge included implied relationships between dress and appearance and differences in organizational membership, organizational role, and organizational level. Dress appeared to be a symbol used by participants to define their organizational categories as well as the categories of others.

In short, the dress descriptions and explanations that participants contributed during our interviews seemed to reflect the notion of cognitive schemata. Dress appeared to be a part of various schemata inherent in our informants' understanding of their work. A schema is a "cognitive structure that represents knowledge about a concept or type of stimulus, including its attributes and the relations among those attributes" (Fiske & Taylor, 1984: 140). A schema is a type of knowledge structure or mental template that individuals impose on an information environment to give it form and meaning (Walsh, 1995: 281). Dress attributes and relationships among these attributes appeared to be part of a larger structure of organizational knowledge, or schemata.

Importance and Content of Dress Knowledge

Previous scholars have argued that schemata are important to organizational functioning (e.g., Gioia, 1986; Weick, 1979). Weick (1979: 50) argued that a schema is an abridged, generalized, corrigable organization of experience that serves as an initial frame of reference for action and perception. Schemata about appropriate dress were particularly important to individuals in this organization, because this business school lacked a formal dress code. The only dress code available to organizational employees was the following broad, university-wide one:

> Each employee is responsible for presenting a personal appear-
> ance which recognizes the need for good grooming and neatness
> in order to avoid distracting others and to comply with safety
> standards.

All participants were aware of the broad dress code, and almost everyone stated that their dress was *not* constrained by organizational dress policies. The absence of a formal dress code meant that employees experienced their dress decisions as discretionary. Given considerable discretion over what to wear at work, employees acquired knowledge about how to dress appropriately for their particular roles. They had to organize and incorporate complex knowledge of dress into cognitive schemata related to their organizational roles.

We describe below the dress knowledge that was embedded in four schemata respectively organizing employees' perceptions of membership in

the organization, in its hierarchical levels, and in its functional areas, and perceptions of role-relevant events. Each of these four schemata included knowledge of specific dress attributes as well as relationships among these attributes. We propose that the dress attributes in each of these schemata acted as markers or cues that helped individuals navigate the organization and their roles within it. The set of these dress markers (embedded within the set of schemata) composed employees' dress knowledge.

Dress and Schema of Organizational Membership

Two particular dress attributes were important for membership in the business school, and all of our participants mentioned them. First, the attribute of "professional dress" distinguished an organization member from a nonmember. As one participant explained, "There is an unspoken, very unspoken norm of dressing professionally." Professional dress, according to our participants, meant conventional, conservative, unornamented clothing, in subdued or placid colors (cf. Lurie, 1981; Molloy, 1977). Professional dress involved an intricate combination of additional attributes, which included wearing the right components of clothing, coordinating them appropriately, and carrying oneself in a professional way. One participant told us:

> I think they [the business school] expect professionalism mostly the way that you carry yourself. I don't think they want us going around looking really tacky or sleazy. I think whatever you wear, you can wear it appropriately.

Professional dress also included components that, in the aggregate, approximated business attire. The women in our sample noted a wide variety of possible dress choices: suits, dresses, shirts, jackets, sweaters, skirts, and a variety of accessories. However, a common denominator was that all these clothing components should be "conservative" or "professional" in style.

The relationships among the parts of an outfit created a whole that could then be interpreted as appropriate, or fitting with the organizational membership schema. During interviews, participants frequently mentioned "coordinating" or "matching" the pieces of their outfits. If the various parts of the outfit matched in participants' minds, then the outfit was considered "appropriate" for an organization member. If the parts did not match, the outfit was considered not appropriate. Matching also involved the color or the style of various components of the outfit. To fit the organizational membership schema, dress parts should be of the same style or of the same or complementary colors. Overall, clothing that fit the organizational membership schema displayed the dress attributes of being professional, businesslike, and coordinated.

Second, dress attributes included in the organizational membership schema were defined by the *absence* of particular elements: dirty clothes, jeans or shorts, and distinctly feminine or sexually provocative clothing. As one participant explained:

> Clothing should be pressed—or at least look like it was pressed

> when you put it on. And no blue jeans. No shorts. No miniskirts.
> Probably nothing like real low-cut blouses.

Participants had distinct perceptions of feminine dress that were seen as not appropriate or as not fitting the organizational membership schema. Feminine dress was dress that included brightly colored pieces made of stereotypically feminine colors such as red and pink, frilly and elaborate styles, tight, revealing, and "sexy" styles, and elaborate or excessive jewelry. The attributes that constituted feminine attire for participants are consistent with those identified by various authors (cf. Lurie, 1981; Molloy, 1977; Wolf, 1991). Our participants consistently noted that such attire was *inappropriate* for organization members. In other words, such dress was viewed as inconsistent with the organization member schema (Fiske & Taylor, 1984).

Participants' designation of "dress outliers" reinforced the dress attributes included in the organizational membership schema. Individuals who dressed either too informally or in a style that was too feminine were singled out. One participant noted:

> There are some people—especially some of the younger people—who wear their jeans a little too tight. It's kind of unprofessional. You know, maybe the miniskirts—there are comments about that—it's not too professional. Those are things that people, I think, speak out about. Things that really kind of stand out, not the norm.

Participants' knowledge of what dress was appropriate and inappropriate was thus part of the cognitive structure of attributes and relationships that composed a schema of organizational membership.

Dress and Hierarchical Level Schemata

Within the organizational membership schema, different dress attributes distinguished members at different levels in the organizational hierarchy. One clear difference was apparent between the schema for employees at the managerial level and the schema for employees at the clerical level. Appropriate dress for women at management levels required skirts and jackets, or suits. In contrast, the schema for women at clerical levels allowed for more casual skirts, pants, sweaters, blouses, and jumpsuits. One woman noted, "If I were in management, I wouldn't wear it [a jumpsuit]." Another explained that suits were not appropriate for a person in her position as a word processor, because in her office (the placement center), "Counselors always dress in suits because they are more or less at the supervisory level."

Dress and Functional Area Schemata

Furthermore, slightly different dress attributes distinguished among different functional areas of the school. Functional areas varied in the extent to which conservative dress was included as an attribute of members' schemata. All participants agreed that the schema for executive education included the most conservative and formal dress attributes; the schemata for employees in the dean's office and placement office included less conser-

vative and more casual dress styles; and the schema for employees in document processing included the most casual attire. Participants were aware of the multiplicity of functions fulfilled by employees in different parts of the school and associated these functions with different schemata. To illustrate, a participant from executive education stated:

> We have corporate clients here. They pay a lot to come here. We should treat them accordingly, and dress accordingly. Much more formal and nice maybe than in other parts, like maybe a faculty secretary or document processing [where they see only students or faculty].

Dress and Schemata of Role-Relevant Events

The data further suggest that dress is a component of employees' schemata for events associated with their organizational roles. These event schemata are the knowledge structures that describe the sequence of occurrences or relationships among attributes in well-known situations or events (Fiske & Taylor, 1984: 167). Participants in our sample held different event schemata for the special tasks and occasions that were part of their organizational roles. Dress was an attribute of the schemata that employees used to distinguish these events (such as presentations, workshops, and staff luncheons) from the typical workday. For example, one participant described how staff members dressed up for the dean's luncheon:

> Last Friday the dean gave a luncheon for the staff, and I noticed that everybody dressed a little bit special—maybe in a nicer dress that they don't wear all the time, or a nicer skirt and blouse, or they wore heels that day. For special events people will dress up.

Our informal observation of the dean's staff luncheon corroborated participants' perceptions that staffers dressed in a more festive manner for special events. At the dean's luncheon, we noted that staff members wore clothing in floral patterns or in lacy and fancy styles more than they would on a typical work day, and they wore jewelry that was larger and more festive.

Membership, hierarchical level, functional area, and event schemata did not fully prescribe individuals' dress knowledge. Rather, some variation in dress behavior was perceived as acceptable even if it did not fit a schema, particularly if one's task included unusual physical requirements. To illustrate, all participants commented how wearing jeans or other such dress was "okay" if your job required messy tasks, even though the informal dress contradicted the organizational membership schema.[5]

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[5] Our data suggested that downward adjustments in dress to accommodate "unusually dirty" tasks or events bore implications for employees' sense of personal worth and integrity. Such deviations from organizationally appropriate dress in favor of task-appropriate dress were frequently associated with self-accusations and deprecations. Participants who wore sneakers or jeans talked of themselves as "klutzes" or "clumsy" because they could not lift boxes in high-heeled shoes, or could not answer phones when wearing a fancy necklace or dressy earrings.

Thus, participants had a fairly complex and comprehensive map for appropriate dress. This map was composed of a set of schemata in which dress was a recurring theme. Dress in this organization displayed diluted stratified homogeneity, defined as "variance in the dress among subgroups of the organization, but homogeneity within each of the subgroups" (Rafaeli & Pratt, 1993: 43). We use "diluted" here because the differences among subgroups were not as extreme as those in the contexts observed by Rafaeli and Pratt, which included hospitals and restaurants. However, employees in all parts of the school appeared aware of the differences that did exist.[6]

The consistent appearance of dress as an attribute of member, hierarchical level, functional area, and event schemata helped us to understand how our sample study group made dress decisions. In the very broadest terms, they sought to dress appropriately for membership in the organization. More specifically, they identified dress attributes appropriate to particular hierarchical levels and functional areas in the organization and to the particular events occurring on a given day. They then selected and wore dress that was consistent with these attributes. But how did our participants learn about the dress attributes that fit within membership, level, area, and event schemata? Our data offer initial insights into this question.

Learning about Appropriate Dress

Our findings clearly confirm that employees' dress in this organization was not a result of organizational fiat. Rather, it appears that employees expended considerable informal effort to learn about appropriate dress. Participants were articulate about the effort. To illustrate, one participant, in response to a question about whether she felt uncomfortable talking about her dress, explained:

> I don't feel weird about discussing dress [with you], because, you see, I've studied it. I've looked at these articles about clothing for a long time. I've learned some strategies, I had to.

Women in clerical roles differed from those in management roles in terms of how they learned what constituted level-appropriate dress. Managers reported transferring notions of appropriate dress from their prior corporate work experience; several also noted that spouses who worked in corporate settings influenced their assumptions about dress. Some women

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[6] In spite of the differences among the various areas, our data also suggest that business school dress was distinct from dress in other parts of the university. Although we did not collect systematic data about other parts of the university, two data points support these differences. First, the notes of the researchers from the psychology department indicated their own dress was significantly less formal than what they encountered at the business school. Second, almost all our participants noted that they observed a difference between the dress standards in the school and in other parts of the university. The dress of business school students also differed from that of students in other parts of the university. For example, one participant noted: "I came here from another part of the university. People here tend to dress a little more spiffy. Even the students dress a little more spiffy than in other colleges."

in management also reported learning vicariously. They read articles on professional women's clothing and fashion in business magazines such as *Working Woman* and *Savvy*. These women transferred conceptions of appropriate dress from corporate environments to the business school setting (Bettenhausen & Murnigham, 1991; Feldman, 1984; Gersick & Hackman, 1990).

Clerical employees, on the other hand, reported acquiring dress knowledge through a process of social learning, that is, by observing what others within their units wore for particular roles and events. One woman noted, "When I first took this job I quickly realized that I did not have the appropriate dress. I just observed." Such observations provided a frame of reference that was engaged during employees' shopping, as another participant reported:

> I would go into stores, look around, and sort of match up my [clothes] with what I saw. Then I started to shop according to those guidelines that I had.

Observing the dress of their supervisors or managers was especially important for clerical employees. One woman reported that she learned what was appropriate "by observing the higher-ups. I think they're acting the way they want everyone else to act, so you just need to be aware, be smart and use common sense." Management-level women were aware of their influence on the dress of others in the organization. As one supervisor remarked: "I think I affect the way they [the women in the office] dress, but I don't think they affect me."

Learning the schemata appears to involve an evolving interaction between behavior, feedback on this behavior (reception of information), and an emergent change in the corresponding cognitive schemata. The process our participants described is consistent with bottom-up theories of schema development (e.g., Fiske & Taylor, 1984), wherein small incidents and acts serve as benchmarks, and pieces of information surrounding these incidents accumulate into a larger and more refined schema. The process is evolutionary and reciprocal: feedback received about one's behavior leads to adjustments in the schema. The adjusted schema then influences further behaviors. A quote serves to illustrate:

> They sell these nice suits with shorts now, you know. I thought they looked nice enough. So I wore one to work once. I felt really strange. My supervisor didn't tell me to change, but she said, "I don't think they allow shorts. Do they?" I don't think I'll do it again.

This investment of thought and cognitive effort in learning about dress was not viewed as a useless practice; rather, participants construed it as a part of a learning process that could enhance their role performance. In particular, as elaborated below, cognitive investment in dress put our participants in an appropriate mind-set for their organizational roles and helped them establish the best interactions with the people they were expected to

serve, such as students and corporate representatives, whom we subsequently refer to as "clients."

DRESS AND ROLE EXECUTION

Our data suggest three primary ways in which participants saw appropriate dress as facilitating effective role execution. First, knowing and putting into action appropriate dress helps individuals enter the role of employee while shedding other (nonorganizational) roles, such as parent or friend. Second, appropriate dress enables organization members to establish a comfortable emotional state that facilitates their role performance. Third, appropriate dress enables organization members to relate effectively to others.

Appropriate Dress and Shedding Nonorganizational Roles

Individuals saw the wearing of dress that fit their organizational membership schema as one important signal (to themselves) that they were now acting out their "work selves" and temporarily making other selves less salient. In this way, dress facilitated the process of identity compartmentalization (Turner, 1987). Organizational dress closed off some identities while opening up another. By opening up the role of organization member or employee, dress made that social identity salient.

The construct of social identification as developed in social identity theory focuses on the cognitive aspects of connection with a collectivity (e.g., Ashforth & Mael, 1989; Dutton, Dukerich, & Harquail, 1994). Ashforth and Mael defined social identification as the "perception of oneness with or belongingness to some human aggregate" (1989: 21). Dutton and colleagues defined organizational identification as "the degree to which a member defines him- or herself by the same attributes that he or she believes define the organization" (1994: 239). Dressing in a manner prescribed by the organization member schema helps to convey that a member is associated with the values or characteristics of an organization. Donning appropriate attire makes salient the identity of member at the same time it makes less salient other plausible social identities (such as parent or volunteer).

Goffman (1967) described a similar process but focused on communication to others rather than communication to self. In Goffman's analysis, individuals use symbols to communicate to others who they are and what role they are playing. "Face" is the social value a person effectively claims for him- or herself in interactions with others (Goffman, 1967: 5). Seen through a Goffman lens, the dress worn to work serves as an external symbol that enables an employee to create an organizational face, a face consistent with an organizational role.

Several participants described thinking about and owning totally different sets of clothes that paralleled their different social identities, or social faces. The most frequently mentioned face change involved using dress to don the identity of organizational member. A typical comment was: "I have

this set of clothes I can wear to work. I just pull an outfit from that group."
A similar sentiment was evident in comments such as:

> We wear work attire. Not something that you wear when you go
> out on a date or go out with your friends.

> I have my work clothes and my home clothes. The moment I get
> home I have to change into my home clothes, like sweats.

These dynamics are similar to those described by Rafaeli, who argued
that "in wearing attire that was designated as organizational, individuals
temporarily shed other, nonorganizational roles and adopt the role of em-
ployee" (1989: 387). Dress seems to help with role shifting by serving as a
means of autocommunication; dress is used as both a means of cueing one-
self to behave in a certain way (Broms & Gahmberg, 1983) and a means of
shutting off alternative modes of behavior. One participant captured the
latter function of organizational dress, saying: "There's a whole part of my
personality that isn't expressed when I'm dressed for work." Interestingly,
however, Rafaeli's (1989) proposition is based on pieces of attire that were
formally associated with the organization, such as a smock or a name tag.
The present data extend this proposition to informally emergent knowledge
about appropriate organizational dress.

Appropriate dress not only helped women enter roles, but also en-
hanced how they executed the duties associated with their roles. The pro-
cess through which such enhancement occurred was built on the inherent
ability of dress to evoke certain feelings in both role occupants and target
persons. Thus, donning appropriate organizational dress induced our par-
ticipants both to embrace appropriate feelings for their roles and to evoke
certain feeling states for target persons.

Appropriate Dress and Role Feelings

First, all of our participants linked the way they dressed with the way
they felt on the job, and all of our participants referred to how their attire
made them feel when they were asked to describe what they were wearing.
Our analysis suggests an association between organizationally appropriate
dress and various feeling states, including psychological comfort and social
self-confidence.

Dress and psychological comfort. Participants consistently associated
appropriate dress with a sense of psychological comfort. In Goffman's (1967:
8) terms, being dressed appropriately can signal to a person that he or she is
"in face," so that he or she "typically responds with feelings of confidence
and assurance." Personal discomfort was associated with inappropriate
dress, because, in Goffman's analysis, inappropriate dress is a signal that a
person is "out of face." Participants' discomfort with inappropriate dress
follows some of the theoretical work on self-discrepancy and cognitive dis-
sonance. As Higgins (1985) noted, people have ideas about who they are (the
"actual self") and who they ought to be (the "ought self"). In this context the
ought self is prescribed by the various schemata and therefore includes
dressing in a manner consistent with one's organizational membership,

level, and area, as well as with the events of the day. When the actual self and ought self are discrepant, the person is predicted to become uncomfortable and anxious (McCann & Higgins, 1988), which were precisely the feelings that study participants described as resulting from a sense of wearing inappropriate dress.

The idea of appropriate dress implies that there is a meaningful distinction between organizational comfort and personal comfort. Organizationally comfortable dress was dress that was organizationally appropriate (i.e., fit with the membership schema), but not necessarily physically comfortable. This complexity was difficult for participants to communicate. One woman stated, "What is comfortable (to me) is not necessarily appropriate." When asked to describe the way she was dressed, another participant noted:

> I feel more comfortable in it. Personally, it's not me. OK? But I feel more comfortable in it than when I dress "how is me." Does that make sense? Because of the perceptions, opinions, looks, what not, if you do not dress this way. And then I start feeling really uncomfortable and I find I'm making excuses as to why I am dressed that way.

Participants described inappropriate dress as uncomfortable because it was distracting to others or to self. Inappropriate attire distracted others by allowing them to think of the individual in some way other than as an organization member, thus diminishing effective role performance. A strong theme in our data was that attire that was too feminine, too tight, too revealing, or in some way sexually provocative was inappropriate. Consistent with Wolf's (1990) and Sheppard's (1992) theses, our data revealed that inappropriate attire made people feel uncomfortable because participants thought this kind of dress would invite sexual attention from onlookers, producing discomfort. In short, emotional comfort was associated with organizationally appropriate attire: professional, and not too feminine.

Dress and social confidence. Dress also elicited a sense of social self-confidence for members who wore what they perceived to be appropriate attire. According to Goffman, when a person is in face, he or she is able "to hold his head up and openly present himself to others" (1967: 8). Consistent with Goffman's analysis, our data revealed recurring mentions of an association between being dressed professionally (i.e., in a manner consistent with the organizational membership schema) and feeling competent and confident:

> When I'm dressed up then I feel like I can work faster and stuff. I guess, I don't know, but I guess I present a more confident appearance when I'm dressed up.
> I guess when you dress up, you feel better about yourself. You know you've got to go in and get something done so it helps out [to be well dressed].

In contrast, the negative effects of wearing inappropriate attire on feelings of self-confidence were discussed:

> I'm in a middle management position; [therefore I must dress up,

because] when I'm sitting at a meeting with people that are all at higher levels than I, only if I'm dressed right, then I don't feel so intimidated or out of place.

Thus, dress provided a type of emotional wrapping that members saw as facilitating self-confidence. Dress that fit the organization, the area, the level, and the event was appropriate and enhanced self-confidence. Members' use of appropriate clothing to generate comfort and confidence was somewhat surprising to us. Recipes for dressing for success in organizations (e.g., Molloy, 1977) and talk of the political credits gained by dressing success-fully (e.g., Wolf, 1991) are abundant. But these prescriptions offer little in-sight into the emotional lift that accompanies donning appropriate attire in organizations. In our data, dress appeared to be a tool that helped role oc-cupants evoke the emotional states that they believed would facilitate their own role execution. Being able to accomplish this emotional life depended on learning the appropriate dress.

Appropriate Dress and Establishing Relationships

Individuals also used appropriate dress for establishing relationships important to accomplishing their work. More specifically, members con-strued appropriate dress as a means of enhancing relationships with people they had to interact with during a role performance. This finding is consis-tent with the relational aspects of role theory. Role theory depicts each individual's behavior as entwined with others' expectations and behavior (Katz & Kahn, 1978). Our study suggests that employees saw dress attributes as a means of managing relationships with others, thus facilitating the rela-tional aspect of role taking. Thus, the dress attributes included in the various cognitive schemata were not arbitrary, but seen as important aspects of main-taining the type of relationships that organizational roles required. Interest-ingly, the dress attributes viewed as enhancing role relationships were all within the boundaries of "appropriate dress" for organization members. Thus, subtle changes in dress choices according to anticipated interactions were seen as accomplishing different relational goals.

The two aspects of a relationship most influenced by dress were the status of a role occupant and her authority over a target person, and the rapport between the role occupant and target person. Participants saw dress both as a way of rising in status relative to others and as a means of con-necting with others. First, study participants viewed subtle variations in the use of "formal business-like" dress and dress that was *not* overly feminine as attributes that enhanced status and respect. Describing her business-like formal dress, one participant explained, "I use dress to put me as someone to treat with respect. Someone that they will trust and respect and listen to." Another noted that she dressed in this way because it helped her appear "commanding." A third described her preference for outfits that she felt exhibited the "power look." One participant described how she used dress to position herself as an authority to a group of visiting executives:

> When I stand up there on Monday mornings and introduce my-
> self to the participants, the easiest thing in the world would be
> for them to think of me as a secretary or a gopher. So I try to
> signal in what I say to them that I am more than that. I try to do
> that with my dress, which is why I tend to be more conservative
> [in my dress] on Mondays.

By using professional dress to signal her administrative role, this participant
tried to manage the expectations of her target audience.

Interestingly, our data did not suggest that participants used dress to
enhance their individual career mobility, to move up in the organization.
Instead, they used dress to enhance status relative to role-related targets by
appearing competent and effective in their current positions. For instance, in
the last example, the woman did not dress to advance in the hierarchy but
rather, to communicate her place in it, and thus to signal to target people
how they should view her and her role.

Second, participants saw dress attributes as a means of enhancing rap-
port with target people. Employees' assumptions about their targets' expec-
tations and reactions to various dress styles guided dress selections. Em-
ployees assumed that providing the best service to their clients involved
letting appropriate dress be defined in part by them. Hence, our participants
integrated assumptions about clients' expectations regarding dress into their
idea of how to deliver quality service, which they assumed was a key organ-
izational value.[7] One secretary noted, "My clients are faculty and students,
so I can dress more casually." In contrast, participants who worked in the
executive education center felt that because they interacted with corporate
executives, they should dress in corporate business styles. One participant
explained:

> We have clients, executives. [So] most of the people here dress
> well. They should. Anytime one is around participants, they
> should be more dressed up than if only seeing students. We deal
> with TOP executives of TOP corporations. We take BIG prices.
> The way employees appear is a part of what these corporate
> clients get.

Establishing Relationships in an Environment with Multiple Clients

Tailoring dress to clients was complicated by the fact that the organiza-
tion was simultaneously serving multiple sets of clients. The business school
environment includes both the university and corporations, and the corre-
sponding clients for the administrative staff are students and corporate rep-
resentatives. Areas in the school varied in the extent to which the two groups

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[7] The importance of service was constantly communicated to the administrative staff in
different ways. To illustrate, in his speech at the dean's lunch, the dean emphasized: "We're all
in the service business—OK? All of us are in the service business. I'm asking all of you to begin
the process of setting new standards for the school—our school image is one of quality, help-
fulness, courtesy, and service, because it's part of our total image."

of clients were encountered, and individuals varied in the extent to which their roles included interactions with each of the two groups.

Participants assumed that the two client groups expected distinct dress styles. All participants assumed corporate representatives expected professional business dress and students expected a less formal appearance. Yet, consistent with variations in individual roles, participants varied in the extent to which they integrated these expectations into their own dress behavior. Participants were sensitive to the differing expectations of their clients and attempted to navigate between both groups.

Dressing to deal with multiple clients was complicated because these employees did not always know whom they would encounter throughout the day. Consequently, they employed various strategies to balance the expectations of the two client sets. One strategy was for an employee to prioritize one client group over another, either by determining some hierarchy of clients or by determining which client group she served more frequently when determining which schema to put into action. For example, the following participant (in the public relations office) noted how her assumption that she should never be dressed too informally for her corporate clients governed her dress decisions:

> Corporations do a lot of college relations business [here]. You
> never know who's dropping into my office, so I'd never want to
> be totally relaxed [in my dress]. I'd never come to work in slacks.
> Even summer outfits seem too informal.

Similarly, employees in the student placement center explained that they dressed in a corporate fashion at all times except on Fridays and during summer vacation, because they assumed that corporate recruiters or representatives might come in at any other time. The unstated assumption was that on Fridays and during the summer only students were likely to come by, and it was okay to dress more casually for students.

Another strategy was to establish which client group was more demanding and to attempt to satisfy that group. As one participant explained: "I feel like we get higher standards and higher expectations from the corporate sector." Yet another strategy was to treat encounters with a special set of clients as a "special event." For example, a secretary in the dean's office explained how twice a semester she met with the presidents of the student clubs and on those occasions wore something more "professional" than she normally would. In addition, we noted that at talks given by corporate representatives, the dress of the administrative staff members coordinating the events was significantly more corporate and business-like than it was on other days. These talks appeared to elicit a special event schema, which included assumptions about appropriate dress.

It seemed that employees who expected to be around corporate representatives, either regularly or for a special event, significantly upgraded the formality of their attire. We observed that participants tended to view the perceived expectations of clients such as executives or corporate representatives as more important than the expectations of clients such as students,

although it was unclear whether this tendency reflected an assumed organizational hierarchy with respect to clients or some other decision rule.

THE WORK OF DRESSING APPROPRIATELY

The administrative staff members in our study cared a great deal about achieving appropriate dress. Their concern was quite apparent, especially when participants described the stress they experienced when they wore inappropriate dress. The women made a considerable emotional investment in worrying not only about inappropriate dress, but also about possible dress crises and mishaps. Mentions of dress crises in our data reveal considerable anxiety that such crises might occur. One participant summarized:

> Everybody has their off days, or maybe they might have slept in. Or, you are trying to drink a cup of coffee on your way to work and spill some down the front. That's my biggest fear. Oh, my God, I'm going to have to go around all day sitting at my desk with this terrific stain on the front of my blouse.

Participants worried especially about violating the dress attributes of the organization member schema. Most notably, they were concerned about dressing in attire that was either too revealing or too casual. A fear of disapproval and even of reprimands from supervisors if they came to work wearing miniskirts, tight pants, sweat pants, shorts, or jeans was described. Interestingly, our data included few mentions of actual reprimands; reports of the emotional distress from fear that reprimands *might* occur were much more frequent.

The enjoyment and relief that participants associated with dress-down days (times when more-informal-than-usual dress was the norm) also support the emotional costs of the work of executing appropriate dress. As noted, Fridays[8] and summertime offered tacit relief from the pressure of wearing appropriate attire, and people felt free to wear jeans and other casual attire considered inappropriate at other times.

Avoiding the discomfort of inappropriate dress, however, also required a significant amount of effort. This effort appears to be a part of the "hidden work" that goes on behind the scenes of organizations. The data suggest two distinct types of effort involved in dressing appropriately: (1) the physical effort invested in acquiring dress and artifacts that allowed the maintenance of appropriate attire and (2) the cognitive effort invested in planning appropriate dress according to anticipated events or clients. In practice, the two were often commingled, but for the sake of analytic clarity we will treat each separately.

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[8] Our probing about the history of this tradition confirmed it had emerged informally. All the supervisors we asked noted that they did not know of a formal policy allowing more informal dress on Friday, but all noted that they were familiar with this norm and that they neither supported nor denounced it.

Finding and Wearing Appropriate Attire

Our data reveal that appropriate dress demanded using significant physical energy, both for shopping for appropriate clothes and for wearing them appropriately. Participants described the efforts expended in finding clothing or accessories to help make their dress appropriate. Consider the following descriptions:

> When I came to this job, it was indicated to me that I should not wear slacks. I should expect to wear skirts, and something dressier. It was hard because I had to go and buy clothes in order to conform to what they really wanted.

> A few weeks ago, I bought this bright orange silk top and skirt and wore it to work with a neutral nylon—like a beige nylon— and white shoes and I just knew that outfit wasn't complete. And I looked and looked. Since I had the outfit on, I walked around at lunch, and luckily found a pair of shoes—the perfect orange— matched the dress and I changed the color nylon. I found a pair of earrings that coordinated with the shoes and the outfit.

Both these participants invested personal time and effort to make their appearance consistent with appropriate dress for their organizational roles.[9]

Maintaining appropriate attire required work both on and off the job. Participants talked about the on-the-job work involved in not getting "rumpled," keeping their legs crossed, and avoiding accidental stains. Off-the-job physical work involved maintaining their work clothes, trying on outfits, and practicing wearing new clothes, jewelry, and accessories. One participant explained:

> I was sitting on the bedroom floor reading directions on how to tie scarves, trying to figure it out. I got it, went up to the mirror, and it all fell apart. No, it's horrible. And then I watch people, and they do wonderful things with scarves and it looks fine on them. It's not me, but I wear them. And this stupid thing [the scarf] is driving me nuts.

Participants also expended physical energy in making corrections to an outfit after it had been selected. There was work involved in rectifying inappropriate attire. Consider the following:

> I made a mistake one time. I came in wearing a particular jumpsuit. An outfit. And I actually decided that I should go home and change. It was too casual. And frankly, it would show off a woman's figure too much and be too distracting. It might have come off as being too provocative. My supervisor commented that she wasn't sure they allowed jumpsuits, but she didn't tell me to go home and change. I decided to do it, so I drove back home and changed.

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[9] It could be argued that our participants invested effort in buying clothes because they enjoyed shopping, and the professional nature of the workplace gave them an excuse to exercise this passion. Nonetheless, the point is that there was an expenditure of personal time and money on organizational role requirements, whether or not it was enjoyable.

Our data included many similar cases in which employees' miscalculating the appropriateness of a particular outfit prompted corrective actions. Participants explained that they had gone home to change, had gone to a local store to acquire a piece of clothing, or borrowed something from a friend or co-worker. These small failures to execute the appropriate dress helped participants learn the dress attributes of organizational schemata in more detail and to execute them more effectively.

Dress Planning

Calculations of appropriate attire involved actively planning what to wear to work. This involved attempts to coordinate different elements (e.g., dresses, shoes, jewelry) and dressing to fit the day's plans, tasks, clients, and special events. The recurring goal apparently was to maintain appropriate dress. One participant stated:

> I plan the night before because the morning goes fast. So, I am usually in bed. A couple of thoughts will go and I'll take a quick look in my closet and I go "this or that tomorrow?" I'll pick out my dress and then I'll go to my jewelry.

Another participant described how she used her calendar as a means of planning her dress:

> I always look before I leave the office about what's going on the next day. Do I have anything special? or maybe my boss is meeting with a high executive. Then I usually try to dress nice.

To summarize, assumptions about appropriate attire guided participants' dress choices. These choices were based on dress attributes that composed their schemata for organizational membership, hierarchical level, functional area, and role-related events. Learning and employing these schemata required physical, cognitive, and emotional work.

DISCUSSION

Our point of departure for this study was theoretical work on organizational dress as an important symbol in organizations. Previous researchers have considered dress either as a symbol that leads to various dynamics at the organizational level of analysis (cf. Rafaeli & Pratt, 1993) or as a symbol associated with an individual's occupational or organizational identity (cf. Trice & Beyer, 1987). Our focus in this study was on the dynamics that govern individual employees' everyday dress behaviors. Our findings suggest that dress can be an important component of individual role taking and role performance and that individual female employees recognize and engage this versatility of dress. Our findings further unravel three broad themes about individual navigation by attire: (1) employees informally share and maintain an elaborate structure of dress knowledge, (2) dress relates to role execution in four different ways, and (3) achieving appropriate dress involves considerable work. Together, these themes both extend available knowledge about organizational dress and suggest observations pertinent to

organizational policies that increase or decrease employees' discretion over dress. These observations are especially important given current dress-down trends in organizations in the United States.

Dress Knowledge

Dress knowledge included a sense of clothing components (e.g., suits, jackets, skirts) that were appropriate to the role of organization member and of the appropriate way of presenting oneself while wearing these components. Dress knowledge also pertained to the dress attributes that were part of hierarchy, function, and event schemata. This type of dress knowledge helped individuals compose appropriate dress. None of this knowledge was formally stated or enforced, yet almost all of it was shared by all our participants and was incorporated into various cognitive schemata.

Our thesis suggests that employees view dress as a component of the schemata of organizational membership, organizational (hierarchical) level, organizational functional area or work type, and organizational events. Together, these schemata are useful to employees' understanding and performing their roles in organizations. Knowledge of dress is therefore shown here to be integral to employees' making sense of the organizational reality (Louis, 1990; Weick, 1995). The existence of shared dress knowledge as a part of these schemata enhances the processes of sense making and role taking. To illustrate, a part of taking upon oneself the role of a receptionist involves learning the schema of organization member as well as the schemata of the hierarchical and functional level of receptionists within the organization. Role taking involves acquiring, internalizing, and acting out knowledge about dress attributes contained in each schema. Once an employee mastered the knowledge of dress, she was closer to acquiring the complete schema.

The elaborateness of dress knowledge needed to accomplish organizational dress was striking; it is particularly noteworthy given the scant amount of attention paid in previous theory and research to organizational dress. It appears that dress knowledge may be an integral part of role execution. More importantly, it appears that dress should be examined more closely in the context of individual behavior, complementing previous focuses on the organizational or occupational level of analysis (cf. Rafaeli & Pratt, 1993; Trice & Beyer, 1987).

Dress and Role Execution

Participants viewed dress as a way of shedding nonorganizational roles. In this vein, donning appropriate dress is a tool for reducing the strain of role conflict (Katz & Kahn, 1978; Kahn, Wolfe, Quinn, & Snoek, 1981). Wearing appropriate attire was one way participants reduced the stressful intrusion of potentially conflicting roles. Our participants explictly noted that they felt better when dressed "right for the role," even though the right attire was not always the most physically comfortable. Our results suggest that being dressed for a role helps avoid the psychological discomfort of role conflict.

Dress facilitated role execution by helping participants orient themselves toward particular interactions, functions, and events that their roles demanded. That dress is a part of various cognitive schemata suggests that dressing appropriately may actually enhance employees' role execution. To illustrate, an employee who plans her dress in accordance with the clients that she will meet during the day may also be likely to plan other aspects of her encounters with these clients. Noting one's function and selecting one's dress accordingly may be a small but important step toward acting out the broad schema of this function and avoiding behaviors that are inconsistent with the schema.

However, dress may also have negative implications for role execution that were not uncovered in this study. For example, some employees might choose style over substance and not prepare further for their work role once having dressed appropriately.[10] Similarly, established dress standards may conflict with changing fashions or environmental conditions. Adaptation may be necessary (but not recognized) when an organization undergoes a physical or cultural change. Failing to adopt new standards of dress may lead to dress hampering role execution. To illustrate, U.S. companies establishing offices in Israel have found that assumptions about appropriate dress could not be transferred overseas because of local standards of behavior and dress.[11] These dilemmas should be examined in future research.

Dress appears to enhance role execution through its capacity to influence relational activities (Fletcher, 1995). Our participants viewed dress as helpful in shaping relationships with others. They used dress to establish both status and rapport with others. We believe the aggregate effects of the relational aspects of dress work have significant effects on individual clients and on an organization as a whole. For example, dress may be a way to improve service encounters by leading employees to relate more effectively with clients (Czepiel, Solomon, & Surprenant, 1985; Rafaeli, 1989). When employees dress in ways that signal their organizational roles, they reflect in their dress the organization's values and identity, which may signal a willingness to serve clients' needs (cf. Ashforth & Humphrey, 1993).

The Work of Dress

Our detailed look at dress choices makes visible efforts that otherwise remain unrecognized and undervalued by both academics and practitioners. Employees' efforts at dressing to enhance their role performance might be construed as a part of emotional labor (Hochschild, 1983; Rafaeli & Sutton, 1987, 1989). We use the term emotional labor in a way that is consistent with Ashforth and Humphrey's (1993) discussion of such labor in service work. Thus, we see individuals as using dress to feel and display the emotions

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[10] We would like to thank an anonymous reviewer for this idea.

[11] This observation comes from personal communications to the second author from individuals working in these companies.

appropriate for particular situations. Interestingly, participants willingly expended this effort, without the external fiat described in previous research on displayed emotions. This voluntary investment may be a result of the socialized tendency of women to attend to their dress and appearance (Wolf, 1991). But it may also be due to the importance of dress as a signal of social identification, embraced by individuals seeking to place themselves in social situations (Ashforth & Mael, 1989].

Applications to the Move toward Relaxed Dress

Business organizations today are moving away from reliance on formal dress codes and toward allowing employees greater discretion about their dress at work (e.g., Bragg, 1994). Our study implies a rich set of ideas about the influence of such changes on individuals and organizations. First, with a decrease in prescriptions about what to wear to work, individuals have to invest more effort in making dress decisions. Our findings suggest that this freedom will be associated with variety in both individual's mood states and patterns of interactions. More opportunities will exist for both the emotional uplift provided by appropriately selected dress and the emotional strain associated with dress. Social interactions within organizations are more likely to be influenced by individually selected attire than by dress that is constrained by organizational rules.

The influence of relaxed dress standards is likely to be strongest for organization members who have more dress discretion at the societal level (in the United States, women as opposed to men), and for individuals who are in jobs that require diverse types of interrelating. We predict, for example, that women in customer service roles will be more affected by relaxed dress codes than men in back-office, data entry jobs, because the role of the latter is inherently less relational and more constrained.

But our findings also suggest that relaxing dress standards will place additional burdens on employees. Specifically, as dress standards become less formal and less prescriptive, individuals will need to expend more effort in learning and acting out appropriate dress. Effort will be invested in acquiring dress knowledge, planning dress, and executing appropriate dress for work. Greater emotional concern can also be anticipated in preparing and recovering from the distress of inappropriate dress. More physical effort will be required for finding, coordinating, end wearing appropriate dress.

Again, we would expect these costs to be higher for organization members who, in the absence of strong dress standards, have more dress choices (e.g., women rather than men), and for members who experience more variance in their daily activities. Formal dress requirements relieve employees of much of the need to invest time and effort in learning, planning, and executing appropriate dress.

As noted, an increasingly common practice in American business is the dress-down day, which temporarily removes some of the pressure associated with appropriate dress. Adler (1995) reported in *Business Week* that although the phrase "dress-down day" first appeared in print only five years

ago, this practice now affects nearly half of all U.S. office workers. In some organizations, such days are viewed as a reward for employees. That such days are a relief is confirmed by our participants' reactions to the more relaxed dress norms in the summer and on Fridays. Dress-down days imply a change in the various cognitive schemata that govern employees' behavior at work. Employees must master new knowledge for executing the same role, including executing new definitions of appropriate dress. Accordingly, such changes to casual days may increase the individuals' struggle to maintain effective role execution in spite of required changes in dress knowledge. Thus, what may be intended as a move toward granting greater freedom to employees may inadvertently lead to an increased workload.

From an organizational perspective, however, relaxed dress standards may trigger a broader change in the various schemata in which dress is an attribute. For example, if dress stops facilitating the distinction between "me as a member" and "me as a nonmember," organization members' sense of differences between who they are at work and who they are outside of work may disappear, increasing their feelings of authenticity and integrity while at work. However, where the distinction between "me as a member" and "me as a nonmember" has helped employees manage competing and conflicting role demands, relaxed dress standards may increase role conflict and stress. Relaxed dress standards may also influence organizational commitment. If efforts to dress appropriately enhance such commitment (cf. Salancik, 1977), it might decrease as organizational dress becomes less distinct from nonorganizational dress.

Lessons from Studying Female Administrative Employees

This study offers a focused and deep look at a unique and previously understudied sample—women employed in administrative roles in a professional organization. This unique focus offers several novel vantage points for organizational scholars, although it also implies that the generalizability of our findings is limited. First, the study offers some insights into women's experiences in a male-dominated institution. One strong theme involved participants' concerns about the tension between their gender role and their organizational role. Appropriate dress was one vehicle for managing this tension. For example, appearing too feminine or sexually attractive was construed to be inappropriate, uncomfortable, and undercutting to one's status. It appears, as Sheppard noted, that "while men's gender and organizational roles are coterminous, . . . women experience a contradiction of being both 'feminine' and 'business-like' (1992: 155).

Conceptually, this discrepancy could be argued to be a symbolic representation of a felt inconsistency between being female and being employed in this organization. This discrepancy begins to explain an often-stated, but not well-documented, argument that women expend extra effort to fit in and achieve the status of organization member in many settings. Our study suggests that women may make an extra effort to eliminate feminine cues from

their appearance, over and above the effort required to maintain appropriate behavior for a given area, level, or event.

Our focus on women in administrative positions sheds new light on employees who are marginal in many organizational systems. Because of their marginal status, such employees may need to engage subtle means, such as dress, to navigate their way through the organizational setting. This marginality may have contributed to the emphasis on finding and wearing appropriate dress that was prevalent in our data. All but two of our participants were white women. Although this study offers little direct insight into dress use by employees who are members of racial or ethnic minorities, it is likely that individuals who are organizationally marginal because of their race or ethnicity may also use dress to navigate their way through their organizational settings. Contrary to our expectations that individuals might use dress to express their individuality, we did not find much evidence of dress as a form of self-expression. Moreover, contrary to literature on "dressing for success" (e.g., Molloy, 1977), we did not find extensive evidence that our participants used dress as a means of standing out or of individuating themselves in the organization. Perhaps the relative absence of such motives was due to relatively limited advancement opportunities for the marginal members of this organization. Additional research is necessary to explore how generalizable these findings are to employees who are marginalized for reasons other than gender, and to employees who are more central and more powerful.

Women face a wide range of available dress choices. They are presented with a large variety of colors, styles, fabrics, and ornaments, and they must therefore expend energy to coordinate their attire. Our data suggest that energy is spent both in minimizing the probablity of dress errors and in correcting dress errors if or when they occur. This set of dynamics regarding organizational dress may not be applicable to male employees, if men are not as sensitive to dress and appearance, or if they have fewer dress options available.

This study of organizational dress contributes to thought about the use of symbols in organizations. In particular, the study emphasizes two ideas that have not been given adequate attention: (1) that symbols can be individual-level variables and (2) that symbols can influence role occupants as well as target individuals. We found that our participants were highly sensitive to the role that dress symbols could play in their organizational participation. Our study suggests that individuals actively work at manipulating these symbols, both to communicate to others and to communicate to themselves. Again, additional research is necessary to explore whether these findings are unique to women in organizations. More broadly, quantitative research is necessary to test the generalizability of our findings beyond this setting and this sample. Field and lab studies can test our assertions that particular dress influences one's status, physical or social comfort, and the nature of the rapport that develops with other people. Future studies can also investigate how employees use dress to manage competing or conflict-

ing organizational role demands, such as demands to establish rapport with dramatically different client groups.

Dress is a versatile symbol actively engaged by role occupants interested in effectively executing their roles. But learning to use this symbol and applying this acquired knowledge requires efforts that organizations do not formally prescribe or reward. The women in our study had deep dress knowledge that they used to identify with the social group of organization members to affect their emotional states of self-confidence and level of social comfort, and to affect their relationships with others. They were less concerned with the political implications of appropriate and inappropriate dress, and more with how this symbol influenced their own behavior at work. Our findings only begin to unravel the merit of analyzing dress at the individual level. This study introduces a number of questions that suggest a rich agenda for further theoretical, empirical, and managerial investigation.

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APPENDIX

Interview Protocol

The interviewer made the following introductory statement: "Hello, I am writing an article for a professional magazine on what people wear when they work . . . Can I talk with you for a few minutes?" She then explained the types of questions she would ask. Specific questions were as follows:

1. Describe your role in the business school. How long have you worked here?
2. Can you tell me about your work path? What jobs did you have to get to this point?
3. Describe the way you are dressed today.
4. Why are you wearing this?
5. How do you feel being dressed this way? (Probe: Do you feel comfortable? Do you feel like yourself?)
6. Do the people you work with affect your dress? How?
7. Tell me about situations or times in the business school when you have felt uncomfortable about the way you dressed. (a) What was the situation? (b) Why did you feel uncomfortable?
8. Tell me about the situations or times in the business school when you felt really good about the way you were dressed.
9. Do you recall how you felt when you first had to dress for work? (a) Did your feelings change over time? How? (b) How long did that take?
10. What does the way you are dressed tell me about you?
11. What would you add or change about the way you are dressed to tell me more about you?
12. What do you think the business school expects of you in terms of what you wear?
13. How did you learn about what is expected of you at this business school?
14. Have you changed the way you dress since working at the business school? How? Why?

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ISOMORPHISM IN CONTEXT: THE POWER AND PRESCRIPTION OF INSTITUTIONAL NORMS

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To what extent do broadly based sociocultural norms affect the distribution of organizational characteristics within a population over time? Under what circumstances are institutional norms more important than alternative processes, such as market forces, in shaping this distribution? This sociohistorical analysis of the impact of nationalism on the language of publication of Finnish newspapers in the 19th century examines the interplay of institutional, ecological, and economic forces. The findings confirm that the power with which institutional norms influence organizations can vary over time, across levels of analysis, and as a function of ecological and economic forces and other, more proximal, sources of institutional expectations.

The organizations literature continues to present increasing convergence between organizational ecology and institutional theory (Baum & Oliver, 1991, 1992; Carroll & Hannan, 1989; Carroll & Huo, 1986; Hannan, Carroll, Dundon, & Torres, 1995; Singh, Tucker, & House, 1986). In an influential essay, Scott (1987) advocated the view that institutional arguments alone are insufficient to fully explain organizational behavior and are perhaps better positioned as complementary to exchange or efficiency perspectives. Recently, scholars have attempted a rapprochement of these two perspectives by conceiving of their relationship as complementary as well as hierarchical (Baum, 1996). In this framework, the institutional environment is conceived of as the arena for ecological dynamics in that institutional forces prescribe institutionally driven selection criteria via which organizations are created or dissolved.

The institutional arena contains a number of exogenous pressures that influence the structure and behavior of organizations. These include institutional pressures arising from broadly based sociocultural norms as well as pressures arising from connections among organizations, such as depen-

dency and political pressures. Institutional pressures operate in concert with other forces, such as competitive or market pressures, to influence ecological dynamics. In fact, a more complete view of organizational action reinforces the notion that organizations are inextricably embedded in a dynamic system of interrelated economic, institutional, and ecological processes (Granovetter, 1985; Oliver, 1996; Zukin & DiMaggio, 1990).

In an essay on expanding the scope of institutional logic, Powell (1991) noted the following: "Our contribution to the study of organizations will be greatly enriched if we are able to discern the *sources* of institutional patterns, their subsequent *elaboration* and *potency* . . . and the kinds of settings where they operate with the *greatest resonance* (1991: 188, emphasis added). In the spirit of this call, I sought to elaborate and test institutional arguments regarding the prescription and power of institutional norms.

Prior researchers have attempted to test institutional theory against alternative views (e.g., economic) by proposing the existence of one process in place of the other (Kraatz, 1994; Kraatz & Zajac, 1992). However, given the theories' complementary nature, I examine the extent to which institutional prescriptions shape organizational characteristics and identify conditions under which institutional forces might be more important than market forces in shaping the characteristics of new organizations. In other words, are there circumstances under which institutional forces act as powerful drivers of selection? In attempting to answer this question, I hope to demonstrate the importance of historical conditions in shaping organizational characteristics.

The central premise of this article is that conformity to institutional norms creates structural similarities, or isomorphism, across organizations. The majority of institutional research has examined isomorphism resulting from the interconnectedness of organizations (cf. Singh et al., 1986; Tolbert & Zucker, 1983). I argue that an important source of normative prescriptions is the broader sociocultural environment and suggest that the power with which these prescriptions influence organizations can vary over time, across levels of analysis, and as a function of the interplay of ecological, economic, and more proximal sources of institutional expectations. I rely on both historical accounts and longitudinal data to develop hypotheses regarding the specific type of socially mandated features organizations adopt at the time of their founding. Since new organizations face special concerns about legitimacy (Rao, 1994; Singh et al., 1986; Stinchcombe, 1965), it is the goal of this study to demonstrate that institutional forces have important implications for shaping the specific characteristics of new organizations.

I begin with an overview of the relevant theory and then develop specific hypotheses in light of the context under consideration. A significant amount of historical evidence is provided as the basis for subsequent model testing. I seek to extend organizational ecology by examining the prescription of institutional processes and their power to influence the selection of structural features at the time of founding within a population of newspaper organizations.

ISOMORPHISM IN CONTEXT

Institutional Prescriptions

Institutionalization refers to the processes by which societal expectations of appropriate organizational action influence the structuring and behavior of organizations in given ways (Meyer & Rowan, 1977; Scott & Meyer, 1994). Hence, organizations acquiesce to prescriptions based on a variety of institutional norms, or rules, in a desire to achieve a fit, or become isomorphic with, their normative environments (DiMaggio & Powell, 1983).[1] According to Meyer, Boli, and Thomas, such rules

> take the form of cultural theories, ideologies, and prescriptions about how society works or should work ... institutionalized cultural rules define the meaning and identity of the individual and the patterns of appropriate economic, political, and cultural activity (1987: 9).

Thus, the institutional framework is primarily concerned with an organization's relationship or fit with the institutional environment, the effects of social expectations (prescriptions) on an organization, and the incorporation of these expectations as reflected in organizational characteristics.

It is postulated that this fit occurs through the process of "institutional isomorphism." Hawley (1950, 1968) proposed the principle of isomorphism, that variation in organizational forms reflects the diversity of the environment. Organizations within the same population facing the same set of environmental constraints will tend to be isomorphic to one another and to their environment because they face similar conditions. Thus, organizations will come to resemble their environment and each other over time (DiMaggio & Powell, 1983; Meyer & Rowan, 1977). New and existing organizations adopt emergent, socially defined elements and legitimated practices in efforts to become increasingly similar to their institutional environments.

Institutional norms affect two primary dimensions. The first is the cognitive interpretations of founders (Aldrich, 1990). Institutional pressures cause founders to incorporate institutionally favored characteristics in the hope of their organizations being judged as appropriate or legitimate (Meyer & Rowan, 1977). The second dimension is resource flows. Institutional forces have important resource consequences for organizations because they shape people's tastes and preferences and the nature of economic activity (Powell, 1991; Zukin & DiMaggio, 1990). In this regard, the effect of institutional norms is exchange driven.

Sources of Institutional Prescriptions

Pressures for conformity to institutional norms typically arise from a number of sources. These include the broader normative environment, the

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[1] According to Scott, "Norms specify how things should be done; they define legitimate means to pursue valued ends" (1995: 37).

state and other dominant organizations, professional norms and standards, and uncertainty about task requirements. Institutional theorists like DiMaggio and Powell (1983) have argued that isomorphism arises as a result of connectedness among organizations. This "structuration" of an organizational field pushes organizations toward homogeneity.

The large body of work examining isomorphism resulting from the interconnectedness of organizations includes Hinings and Greenwood (1988), Rowan (1982), Singh and colleagues (1986), and Tolbert and Zucker (1983). Work in which isomorphism is viewed as a function of network interrelationships includes Galaskiewicz and Wasserman (1989) and Oliver (1988). Most of this research has examined the degree of conformance to or control by the state, laws, regulation, or resource flows as a measure of the degree of institutionalization.

The problem with this focus is that resource dependence theory provides equally plausible explanations for the observed phenomena (Zucker, 1987). According to Zucker, institutional forces are different from indicators of resource dependence. They are more indirect than measures directly linked to resources because of their "social fact" quality (1987: 447). Meyer and Rowan argued that the effects of the institutional environment "are very different from the effects generated by networks of social behavior and relationships which compose and surround a given organization" (1977: 341). Scott (1987) noted that there are two greatly different levels of institutional environment: the broad environment and the immediate one.

At the level of the broad institional environment, shared understandings and norms are general, whereas at more immediate levels of organizational interconnectedness, norms may be much more specific, and issues of dependency, power, and politics are more prevalent (Meyer, 1994). At the broader level, institutional variables are global, affecting organizations in implicit and diffuse ways (Carroll, 1987; Zucker, 1987).

According to Meyer, Boli, and Thomas (1987), the institutional approach explicitly attends to the importance of broadly based sociocultural expectations in that "the wider setting contains prescriptions regarding the types of organizational actors that are socially possible and how they conceivably can be structured" (1987: 15). Perhaps the strongest support for this view comes from studies of the worldwide development and diffusion of educational systems (Ramirez & Boli, 1987; Thomas, Meyer, Ramirez, & Boli, 1987). Findings point to increasing homogenization of educational models, implying the presence of institutional forces at a global level. Meyer and colleagues (1987) suggested that if such institutions were simply the outcome of political processes, one would expect to see greater variance across societies. However, the existence of global, sociocultural prescriptions operating at a higher level results in the observed homogeneity across nation states with respect to education as well as public policy (Boli-Bennett, 1979).

A number of examples from the social movement domain also evidence the shaping of organizational characteristics by broad sociocultural norms. Christensen and Molin (1995) studied the evolution of the Danish Red Cross

and suggested that the rise of voluntary associations in the mid-1800s represented broader institutional forces that supported individuals' rights. Some of these conclusions are present in the work of Boli (1987) and Thomas and Meyer (1984), who emphasized the importance of institutional forces in the creation and growth of nation states. The work of Edelman (1990, 1992) also highlights the impact of the civil rights movement on changes in personnel practices. Edelman suggested that civil rights legislation created a normative environment that motivated the adoption of nonmandated grievance procedures for employees. Thornton (1995) examined the influence of changes in global business culture on waves of acquisition activity. Using a case study approach, Powell (1988) studied the differing conditions under which an institutional environment can permeate an organization. These studies demonstrate the importance of studying the broad social context in which organizations are embedded.

Thus, isomorphism with the institutional environment is *not* always a result of connectedness with other organizations (DiMaggio, 1992). In fact, isomorphism can result from pressures exerted by broader societal expectations as well as from organization-organization interdependencies.[2] Therefore, there is a need to study the influence of the broader normative systems under circumstances in which such interdependencies do not predominate.

The Power of Institutional Norms

In this study, the power of institutional forces is assessed in three ways: by examining their interplay with other forces, ecological and economic; by examining their relative effects at two levels of analysis; and by assessing variation in the intensity of these prescriptions over time.

Interplay. Institutional activity does not occur in a vacuum. If organizations are inextricably embedded in a dynamic system of interrelated economic, institutional, and ecological processes, it is unlikely that any of these forces operates in isolation (Granovetter, 1985; Oliver, 1996; Zukin & DiMaggio, 1990). Powell (1991) called for a better understanding of organizational outcomes not clearly accounted for by market criteria but perhaps better explained by institutional logic. He noted the importance of investigating the conditions under which institutional forces operate with the greatest "resonance" (1991: 188). I took the view that institutional forces operate in concert with other pressures rather than supplanting them and sought to identify conditions under which institutional forces might be more important than other forces in shaping organizations.

Level of analysis. Recent work in organizational ecology has demonstrated that competitive processes tend to be highly localized (Barnett & Carroll, 1987; Baum & Mezias, 1992). That is, local processes allow for better

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[2] Isomorphism arising from broadly based sociocultural norms is in some respects related to Zukin and DiMaggio's (1987) notion of cultural embeddedness, wherein shared understandings in the form of beliefs and ideologies serve to prescribe and constrain organizational action.

model specification in that they capture the essence of the forces that shape ecological dynamics at the appropriate level of analysis. Ecologists studying institutional processes using density-dependence models have tended to assume equal levels of competition among geographically distant members of a population (Carroll & Hannan, 1989a; Hannan & Carroll, 1992). Recently, however, this approach to density dependence has been revised to suggest that market forces of competition and demand are most likely to predominate at the local level, whereas institutional forces of legitimation are perhaps more global (Hannan et al., 1995). Although analyses at the population level are important for assessing the impact of more global, institutional effects on an entire population, disaggregation of the population by geographic region has enormous potential for capturing differences in these effects that may be caused by regional variations in market structures and resource bases (Carroll & Wade, 1991; Swaminathan & Wiedenmayer, 1991). Local-level analyses offer fine-grained insights not discernible at the population level and allow for the potential examination of the extent to which institutional and competitive forces drive selection at multiple levels of analysis.

Variation across time. It is plausible that there is significant variation in the presence and effect of institutional forces over time. First, the power with which norms directly impact organizations is likely to vary over the course of their existence. Some institutional pressures affect organizations only minimally or not at all. Scott and Meyer (1994) suggested that the effect of norms is influenced to a large extent by the degree to which they are "rationalized" as appropriate. Some norms emerge and are perpetuated indefinitely with a degree of constancy, but others increase or decrease in intensity over time or are replaced with new expectations of appropriate organizational action. For example, numerous laws and regulations simply exist without having any direct influence on organizational activity, whereas the impact of others remains constant or changes over time. Other, more distal norms, such as changes in business or management ideologies, also wax and wane over time. Although grasping this variation is important in understanding differences in the isomorphic tendencies of organizations over time, institutional theorists have yet to devote explicit attention to the changing nature of institutional pressures.

Summary

Organizations are subject to influence from societal and cultural expectations within the larger social system. These prescriptions serve both as blueprints for organizational action and as powerful drivers for selection. They create structural similarities across organizations. They motivate the adoption of socially appropriate practices, influence tastes and preferences, and shape the boundaries of economic activity. It can be argued that the power with which these prescriptions influence organizations varies over time, across levels of analysis, and as a function of their interplay with other

ecological, economic, and more proximal sources of institutional expectations.

DEVELOPMENT OF HYPOTHESES

The research agenda of this study was to examine the power and prescription of broadly based institutional norms on organizations' tendencies for isomorphism at both population and local levels of analysis. The focus of this study was on organizational founding. New organizations often experience a liability of newness and have special concerns regarding legitimacy and survival (Singh et al., 1986). As Stinchcombe (1965) noted, new organizations may become "imprinted" by social, economic, and political conditions extant at their time of birth or founding. Processes of founding are also likely to reflect founders' cognitive interpretations of societal norms of institutionally favored behavior (Aldrich. 1990). Boeker (1989) found that the characteristics of the founders and the founding context of a firm have an important impact on firm strategy and behavior. Thus, it is likely that institutional forces will be especially salient at an organization's time of founding and that it is likely to adopt characteristics consistent with the prevailing normative conditions in the quest for legitimacy. Thus, matching organizational features to the institutional environment is critical for founding success. Although organizational mortality has long been examined in the ecological literature, research on the creation of new organizations has only recently begun to emerge (see Davis and Powell [1992] for a review). Although collaborations between institutional theorists and organizational ecologists abound, ecologists have tended to focus on organizational failures, whereas institutional theorists have emphasized the role of adaptive or transformational processes.

This research studies the organizational founding rates of a population of newspaper organizations, examining how institutional factors shaped the Finnish press from 1771 to 1963. The long and rich history of Finnish newspapers begins in 1771, when a patriotic literary society named Aurora published the first newspaper in Finland. During the next 192 years, 1,011 newspapers of various types were published. In the sociohistorical account provided below, I demonstrate how nationalistic norms prescribed the adoption of Finnish as the dominant language in which newspapers were published.

The rise of nationalism is not unique to Finland. However, the case of Finland is distinctive in that the movement there primarily involved language, not a struggle between religious beliefs (Rokkan, 1970). There is a clear link between nationalism and the language of publication of a given Finnish newspaper at the time of founding. I begin with a definition of nationalism and then proceed with the case of nationalism in Finland.

Nationalism

Andersen (1991) noted the absence of a plausible, scientific definition of nationalism. From an anthropological viewpoint, he claimed that national-

ism is extremely difficult to define or codify because it is, in essence, an "imagined community" (1991: 6). In this imagined community, all members have an understanding of their collectiveness and fraternity.

Hayes (1926, 1960) provided one of the earliest, more psychological explications of nationalism, according to which it is a condition of mind among members of a nationality, for whom loyalty and pride and belief in their nationalism is foremost. Whereas nationality is used to designate a group of people who share a language, culture, and history, nationalism goes beyond this by referring to an actual historical process and the values, beliefs, principles, and ideals implicit in that process.

For Deutsch (1969), nationalism was a process of social mobilization that motivated and drew people into fuller participation within their countries. Nationalism involves intellectuals elaborating and championing a doctrine for the masses. It finds its "lodging in the popular mind" by means of transmission such as informal family education, mass education, and journalism (Hayes, 1926: 62).[3] In fact, Hayes went on to state that journalism is the "greatest engine" for the propagation of nationalist ideals. Nationalism promotes norms of conduct and sets expectations for conformity to these norms (Hayes, 1926: 258).

Nationalism in Finland. The develoment of the Finnish press was strongly influenced by its sociocultural environment. In the 19th century, Finns waged a long struggle for national identity against two powerful groups, a Swedish-speaking elite and the Russian monarchy. From the 12th century onward, Finland had been part of the Swedish empire. During the Napoleonic wars, Russia conquered Finland. However, it retained a fair degree of autonomy and had its own system of government, based on Swedish constitutional laws, and its own "nordic" character (Steinby, 1972). Nationalism began in Finland during the early 1800s but did not take hold until 1840. As the nationalist movement gained strength in the 1840s, this credo emerged: "We are not Swedes, we cannot become Russians, therefore let us be Finns" (Wuorinen, 1931: 83). Academicians, historians, and writers, who extolled the virtues of linguistic and cultural unity in a romanticized and folkloric tradition, drove the nationalist movement. Many of these individuals were from the upper classes and were, for all practical purposes, Swedish-speaking (Steinby, 1972: 34).

These Finns strongly believed that a distinct national culture could only be achieved by linguistic unity (Hamalainen, 1979; Wuorinen, 1931). The cardinal points in the Finnish agenda were "the development of Finnish into a literary language, the creation of a Finnish national literature, and the elevation of Finnish into official language status" (Wuorinen, 1931: 2). Arwiddson, one of Finland's prominent historians, claimed that language was

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[3] This article's focus on journalism as the carrier of nationalist ideals is not intended to discount the other forms of transmission of nationalist values, such as mass schooling and family education.

the main criterion of nationalism (Wuorinen, 1931). Nationalism represented a set of shared values that united people by bonds stronger than those provided by institutions or the state (Wuorinen, 1931: 52).

Nationalism and literacy. The basic importance of literacy for the success of nationalistic efforts in Finland cannot be overemphasized. Authors who study nationalism have pointed out that achieving the goals of nationalism requires a ready and literate citizenry (Deutsch, 1969; Habermas, 1989; Hayes, 1926).

From the time of the Reformation through the mid-19th century, formal schooling for the majority of Finns came about directly as a result of the efforts of the Lutheran clergy. To receive confirmation or be married in the Lutheran Church, Finns had to demonstrate literacy (Lanispuro, 1993 personal communication; Puntila, 1975; Wuorinen, 1931). In 1723, a national ordinance was passed requiring all parents to ensure their children could read. If parents could not assume financial responsibility for their children's instruction, it became the responsibility of their parish. In 1740, the Lutheran Church assumed responsibility for education in Finland.

Thus, in contrast to other countries in Europe, where literacy was achieved through mass schooling, the clergy universalized literacy in Finland. Since the end of the 18th century, Finland has often been noted as a nation with total literacy (Kurian, 1982; Lanispuro, 1993 personal communication). Finland became independent from Sweden in 1809, increasing Finns' readiness to participate in active public discourse about the merits of cultural unity. By the mid-1800s, the sphere of discourse regarding nationalism was already defined for Finnish speakers.[4]

"Finnicizing" the Swede-Finns. Many Finns did not feel that political autonomy was enough to protect them from eventual absorption by Russia or continued dominance by Swedish speakers. They resented the fact that government appointments were typically made to individuals possessing little or no knowledge of Finnish. According to several historians, the Swedish language had firm roots as the language of choice for educated people and the gentry, so much so that they were called Swede-Finns; Finnish was a language reserved for use by the peasant classes and a handful of academicians and cultural historians (Hamalainen, 1979; Steinby, 1972; Wuorinen, 1931). Swedish was also the language used for formal education.

The academics who propagated nationalism were primarily Swedish speakers. As stated above, they had two primary focuses. First, they felt that Russian domination would only be countered through cultural and linguistic unity. Second, the gap between the upper and lower classes in Finland could only be bridged by reversing the processes that had created it. These patriots focused their efforts on "finnicizing" the predominantly Swedish-

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[4] It is also true that before there can be a market for newspapers there needs to be a public sphere of discourse and a literate public (Habermas, 1989). In the case of Finland, this sphere had come into being much earlier.

speaking middle and upper classes (Wuorinen, 1931).[5] The issue of language and the struggle for nationalism became inseparable (Hamalainen, 1979).

Nationalism and newspapers. The Finns fought not only for their distinct national identity but also for freedom of the press (Steinby, 1972). Swedish was the language of government and education, and early attempts to broaden the use of Finnish met eventually with legal sanctions (see the section "Temporal Variation in the Intensity of Institutional Norms"). Prior to the 1840s, use of written Finnish was essentially confined to the publication of history and folklore (Wuorinen, 1931). In 1844, the first Finnish-language newspaper was founded in the town of Kuopio, by a philosopher and statesman named J.V. Snellman. Snellman soon became a leading force behind the movement for Finnish national revival (Steinby, 1972), campaigning for use of the Finnish language as a means to raise Finnish national and civic consciousness. Snellman's paper, which targeted rural Finnish speakers for its audience, began to print scathing criticisms of the Swedish elite. However, many of Snellman's writings were also targeted to the Swedish-speaking upper classes and were therefore published in Swedish. In 1845, another Finnish-language publication, Kanava, was founded, in the town of Viipuri. This newspaper took another strategy. It targeted the educated classes with its mix of social and political content and thus was able to attract readers from the educated classes. In 1847, a Finnish-language newspaper was founded in the essentially Swedish-speaking city of Helsinki. This paper was called Suometar, a reference to "Suomi," the Finnish name for Finland. This newspaper was founded by a group of university scholars who were inspired by ideas of Finnish nationalism and freedom.

Thus, by the end of the 1840s, newspapers had begun to publish in Finnish, and both Finnish- and Swedish-language newspapers began to serve as effective instruments of nationalist propaganda (Wuorinen, 1931). The issue of language was so critical during this period that a prominent newspaper failed as a result of its neutral stance toward the Swedish-Finnish controversy (Kaarna & Winter, 1965).

The Prescription of Institutional Norms

The discussion above suggests that during the period of Finnish nationalism, there existed broadly based institutional pressures, or norms, in favor of publishing in the Finnish language. Scott and Meyer (1994) stated, however, that the existence of norms doesn't guarantee organizational effects. It is only when these norms are called into action as being appropriate that changes in organizational "templates" occur (Scott & Meyer, 1994: 3). This view is consistent with Hayes's (1926) suggestion that nationalism is both process and belief. Nationalism in Finland comprised a number of values, principles, and beliefs, foremost among them the belief that use of the Finn-

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[5] Ironically, since many of Finnish nationalism's early and most ardent supporters could not themselves speak Finnish, they advocated the virtues of Finnish in Swedish.

ish language was paramount for the establishment of a national identity. Nationalism motivated individuals and organizations to adopt institutionally favored characteristics in support of a Finnish identity.

According to Stinchcombe (1965), the attributes and behavior of new organizations will reflect such sociocultural norms. Both Meyer (1994) and Scott (1991) linked institutional environments and organizational structures through a discussion of the adoption of particular structural features that are legitimated by a superordinate system, the sociocultural environment. An adopting organization is not required to conform but seeks to adopt legitimated characteristics in an effort to gain approval and legitimacy. During the period of Finnish nationalism, Finnish was institutionally favored as the appropriate language for newspaper publication. The following hypothesis reflects the influence of processes of sociocultural isomorphism on the creation of new newspapers.

> *Hypothesis 1: The founding rate of Finnish-language newspapers will be higher than the founding rate of Swedish-language newspapers during the period of Finnish nationalism.*

The Power of Institutional Norms

The interplay of institutional and market forces. Scott argued that a variety of exogenous forces "compete with one another for the loyalties" of any organization (1991: 170). Two important forces are institutional and market forces. As noted above, I conceive of these forces as complementary, not contradictory. In fact, many authors have argued that to a significant extent, organizational action is determined by both (Friedland & Alford, 1991; Hirsch, Michaels, & Friedman, 1990; Meyer & Hannan, 1979; Scott, 1991; Zukin & DiMaggio, 1990). Friedland and Alford (1991) pointed out that many aspects of economic activity are institutionally constructed and variable across time. Market behavior is embedded in a broader set of social relations, and the character of economic transactions is often shaped by institutional processes (Zukin & DiMaggio, 1990). Thus, although it is important to examine the impact of institutional forces on organizations in general, it is important to simultaneously consider the interplay of market and institutional processes.

Assessing the potency of institutional forces entails conducting analyses at a level at which both market forces and institutional expectations are likely to operate. To a large extent, the founding of new newspaper organizations is often dependent on the viability of geographically bounded, local markets (Hoyer, Hadenius, & Weibull, 1975). As discussed earlier, disaggregation of a population by geographic region offers fine-grained insights not discernible at the population level by enabling examination of differences caused by regional variations in market structures and resource bases (Carroll & Wade, 1991; Swaminathan & Wiedenmayer, 1991). It has also been suggested that market forces of competition and demand are most likely to predominate at the local level (Hannan et al., 1995).

In order to test whether institutional or economic forces were dominant in this era of strong sociocultural norms for nationalism, it was necessary to consider regional variation. Because language is an issue that would vary across the country from locale to locale, it was important to include in these analyses local-level variables assessing variations in language as well as other influences on localized competition, such as existing levels of competition, availability of resources, and consumer tastes and preferences.

Early Finnish newspapers were general in content and thus succeeded in achieving relatively large distributions outside their places of publication. Reading circles—groups of individuals or families who shared the postal and subscription charges for newspapers—were quite common. However, as the number of newspaper readers grew, so did the demand for local newspapers (Steinby, 1972). This demand led to the appearance of local newspapers whose publishers had little desire to serve a national readership.

The demand for Swedish-language publications continued to increase as a result of increases in educated, Swedish-speaking readers. In fact, since many of the early patriots were from the educated classes, Swedish-language newspapers also published Finnish nationalist ideas and tried to arouse readers' patriotism (Singleton, 1989; Steinby, 1972; Wuorinen, 1931). However, as the Finnish national spirit grew, institutional expectations favored publication in Finnish, even though it was the language of commoners (Puntila, 1975).

For this study, a plausible indicator of regional demand preferences would be the number of Finnish or Swedish speakers in each locale. This indicator is consistent with earlier theorizing and research that suggest potential readership is the most important indicator of newspaper demand (Carroll, 1987; Olzak & West, 1991). In their study of ethnic newspapers, Olzak and West used the overall size of an ethnic population to capture the level of demand for foreign language publications.

Economic rationale would predict a greater demand for Swedish-language newspapers in predominantly Swedish-speaking areas because Swedish speakers would prefer newspapers in that language. A similar rationale can be provided to account for the preference for Finnish-language publications in predominantly Finnish-speaking regions.

Given that Swedish-language newspapers also contained nationalist ideas, an argument can be made that in Swedish-speaking cities, heightened interest in nationalism would simply be accounted for by expanded coverage provided by existing Swedish-language publications or an increase in the founding rate of Swedish-language newspapers. However, I suggest that finding a greater founding rate of Finnish-language newspapers during the period of nationalism, especially in predominantly Swedish-speaking cities, would imply that institutional pressures drove the adoption of institutionally prescribed organizational characteristics. Thus, the creation of a specific type of newspaper differentiated by its language of publication (a characteristic strongly mandated by the nationalism norm) affords an opportunity to explicitly test for the power of institutional norms. Such evidence would

further support the power and importance of broadly based sociocultural norms for organizations. Therefore,

> *Hypothesis 2: Even in predominantly Swedish-speaking locales, the founding rate of Finnish-language newspapers will be higher than the founding rate of Swedish-language newspapers during the period of Finnish nationalism.*

Temporal Variation in the Intensity of Institutional Norms

Is nationalism likely to remain constant, or are there likely to be ebbs and flows in nationalistic fervor? Historical evidence in the case of Finland suggests the latter. Thus, there may be subperiods during the overall period of nationalism (1840–1971) that have differing effects on the founding rates of newspapers. To assess variation in the intensity of nationalism, I relied on information gathered from a number of authors (Hamalainen, 1979; Jutikkala & Pirinen, 1974; Puntila, 1975; Steinby, 1972; Wuorinen, 1931, 1965), translated letters and documents (Kirby, 1976), and interviews conducted with a variety of individuals familiar with Finnish nationalism and the Finnish press. Four subperiods of nationalism were identified. I describe each of these below and offer a hypothesis regarding the intensity of the nationalism norm over time.

First subperiod (1840–62): Beginnings. Until the 1840s, Finnish nationalism was very limited and inconspicuous (Wuorinen, 1931). The first subperiod of nationalism began in 1840, when, a number of historians agree, the movement began to make headway (Hamalainen, 1979; Kirby, 1975; Puntila, 1975; Steinby, 1972; Wuroinen, 1931). The nationalism movement began to develop rapidly during the 1840s. This period was characterized by the recognition of a need for educational and governmental reform and the initial development of a Finnish-language press. Reading clubs emerged at universities, providing a forum for student and faculty discussion and debate about nationalism. The press also began to make significant inroads in rural areas.

As the nationalist movement gained in popularity, the tsarist regime became increasingly concerned about its authority and position. The rising national spirit was perceived as a major threat, and there was recognition that language was the principal component of this movement. In response, the tsarist regime imposed a language decree in 1850 stating that only texts on economic and religious matters could be published in Finnish. Censorship was not applied to the Swedish-language press as it was not perceived to be as great a threat as the Finnish-language press. Historical accounts have questioned whether this law was rigorously enforced (Steinby, 1972). Some accounts even state that patriotic information continued to be published in Finnish-language newspapers under the heading "geography" (Wuorinen, 1965). In 1863, the statute was repealed, and a new ordinance gave the Finnish and Swedish languages equal status. A recent study of the Finnish

newspaper population did not find support for the influence of the language law on newspaper suppression (Amburgey, Lehtisalo, & Kelly, 1988). For all practical purposes, the censorship decree was pretty much rescinded by the mid 1850s, and toward the end of this subperiod, the Finnish-language press began to grow rapidly.

Second subperiod (1863–81): Growth and solidarity. During this subperiod, norms for nationalism and the language issue were very tightly linked. The beginning of this subperiod was marked by rapid expansion of the Finnish-language newspapers. The language ordinance of 1863 put Finnish on an equal footing with Swedish. However, even though Finnish was granted official status, some Swede-Finns resisted its institutionalization.[6]

During most of this subperiod, the nationalist cause focused almost exclusively on the issue of language. Ardent nationalists pushed for what was known as Fennomania, or nationality on the basis of language rights. Finnicization was to be accomplished via two primary means: ardent enforcement of the language ordinance and the use of Finnish in secondary and higher schools.[7] The primary mission during this subperiod was to effectively supplant the privileged position held by Swedish speakers. In response, some of the Swede-Finns began to mobilize in an effort to protect their identity, which they felt would be eradicated (Jutikkala & Pirinen, 1974).

National spirit continued to grow and prosper. The number of newspaper readers increased during this period. Nationalism aroused the interest of both Finnish and Swedish speakers. The ideals of Fennomania and rising national spirit induced many Swede-Finns to subscribe to Finnish-language newspapers (Kurian, 1982; Steinby, 1972: 22).

Furthermore, this support for the Finnish language was occurring without force or explicit coercion (Wuorinen, 1931). Wuroinen noted that no Finnish was taught in the Swedish-language primary schools, but in secondary schools, instruction was becoming available in both languages. He surmised that nationalism influenced voluntary acceptance of the Finnish language by a great number of Swede-Finns. Steinby also stated that, likely for idealistic reasons, many Swedish speakers began to desire education of their children in Finnish-language schools (1972: 38). Swedish-language newspapers also empathized with nationalism, and as long as a significant number of people continued to be Swedish speaking, there was a need for new Swedish-language newspapers (Steinby, 1972).

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[6] An examination of state schools supports this point. Puntila (1975) reported that until the 1870s, there was one state school for every 750 Swedish-speaking children as compared to one for every 7,000 Finnish speakers. The first Finnish-language school in fact only came into being in 1860.

[7] By the 1900s, this goal was being realized. In 1870, only 8 percent of students enrolled in the University of Helsinki were Finnish speakers. By 1900, that number had risen to 56 percent. In 1876, the Home Language Society was formed to provide instruction in the use of Finnish.

Third subperiod (1882–1904): Fragmentation. During this subperiod, the country was experiencing general economic growth as well as the rise of organized labor. In fact, the earliest workers' organizations were closely connected to the nationalism movement, and many were organized under the auspices of reading clubs and literary societies. The Finnish labor movement arose partly as a result of the democratic principles invoked by the nationalists, whose aim was the elevation of all classes to a linguistic and political maturity (Lanispuro, 1993, personal communication; Wuorinen, 1931).

During this subperiod, the nationalism movement underwent some major changes. In the 1880s, divisions emerged between old and young Finnish nationalists (Puntila, 1975; Steinby, 1972; Wuorinen, 1931, 1965). The old Finns pushed for language reform as the primary goal of nationalism; the young Finns were concerned with other economic, political, and intellectual reforms. They sought to extend the use of Finnish beyond daily speech and interaction to the arena of laws, justice, and public administration and to undertake measures necessary for the emergence of a Finnish-speaking upper class.

Differences between the workers and the middle class also emerged. Like the young Finns, the workers sought linguistic unity but also desired economic and political concessions. Thus, other issues began to dominate the efforts of these groups. Vertical and horizontal cross-hatched schisms based on both class and language emerged. The upper and middle classes were separated from the workers, and the Swede-Finns were becoming increasingly separated from the Finns. This situation was dramatically different from that in the earlier two subperiods of nationalism, when these groups pursued a united nationalist agenda.

Russian imperialism grew toward the end of this subperiod. In 1899, issuance of the famed February Manifesto, which stated that Finland was under the direct administration of imperial Russia, marked the beginning of Russification. The tsarist regime introduced the Russian language in various branches of government and made efforts to control the press and secondary education. Both Swedish- and Finnish-language newspapers suffered. It became difficult to obtain permission to establish newspapers during this time, and many were shut down or temporarily disbanded. However, many also survived as they found means to avert censorship or prosecution.

Fourth subperiod (1905–17): Russification. During this subperiod much of the fragmentation that characterized nationalism in the prior subperiod disappeared as Finns and Swede-Finns of all classes united against impending Russian control. Nationalism was infused with a new vitality. Newspapers were central to the Finnish resistance and published large amounts of information and patriotic literature to uphold morale (Steinby, 1972; Wuorinen, 1931, 1965). In October 1905, Russia's position was generally weak as a result of battle losses to Japan and the general strike in Russia (Wuorinen, 1931, 1965). The Finnish also went on a national strike. This demonstration displayed solidarity among all social and economic classes. The Russians

responded by rescinding many of their previous measures associated with the February manifesto.

The unity of Swede-Finns and Finns during this subperiod is not surprising, given that Finnish speakers were now the majority of the population. The Finnish nationalists, with the help of the Agrarian Party, continued to push for even more language rights, including eradication of the Swedish language in Finnish-speaking parts of the country. Swedish was to be assured a place as a minority language, but it was made clear that it was no longer on an equal footing with Finnish. No state support was to be provided for Swedish-language schooling in localities in which Swedish speakers did not predominate. Finland effectively gained independence from Russia in 1917, in part through armed conflict. Although the cause of nationalism never completely disappeared, Finland's populace was now attending to other, more pressing, matters of economic and political reconstruction.

Thus, although nationalism norms were indeed present all during the period 1840–1917, their intensity varied over time. This variation was especially evident during the initial and the fragmentation subperiods, when other economic and political issues dominated the agenda. In the last subperiod, nationalism experienced a resurgence because of Finnish solidarity against Russia.

> *Hypothesis 3: The founding rate of Finnish-language newspapers will be higher during the second and fourth subperiods of nationalism than during the first and third subperiods.*

DATA AND METHODS

The organizational population used in this study consists of all 1,011 newspapers published in Finland from 1771 to 1963. The data were collected from the *Bibliography of Finnish Newspapers,* published by the University of Helsinki (Kaarna & Winter, 1965). This publication is the most comprehensive list of Finnish newspapers in existence; the only periodicals excluded were those containing little or no news, such as advertising sheets or trade journals. The *Bibliography* gives at least the year and month of each newspaper's founding, and in the vast majority of cases, gives the day. Each newspaper in the population was an independent organization; there is no evidence that media chains were in operation during the study period.

Data on language spoken by locale were collected in order to control for economic or market forces. I subdivided the population on the basis of language, coding the numbers of speakers of Finnish, Swedish, and Russian or another language for each city. These are indicators of the absolute numbers of Finnish and Swedish speakers by locale. They are also indicators of resource munificence as a function of differences in locale.

Local population and language data were collected for 209 locales. These data were collected from the historical archive in Helsinki and the United States Library of Congress. City population figures were taken from

census reports published evey 20 years during the early 1800s, every 10 years during the late 1800s, and every 5 years beginning in the 1900s. Density data, such as the number of newspapers publishing in a given year, were also calculated.

Dependent Variable

Founding, defined as the start of a newspaper's publication, is a characteristic of the population of newspapers. In other words, it is the population of newspapers that experiences the birth of a new newspaper organization. I constructed two destination states for founding, Finnish-language paper and Swedish-language paper. Language of publication was entered as a dummy variable coded 1 for papers printed in Finnish and 0 for papers printed in Swedish. This dependent variable allows for the testing of the institutional arguments made in this study as it is an indicator of institutional norms of nationalism. Figure 1 shows the distribution of newspaper foundings by language of publication.

Independent Variables

Nationalism. Institutional influences were coded in terms of period effects. The variable nationalism, used to assess the main effect of the impact of sociocultural norms, was a dummy variable coded 1 for years marked by nationalism (1840–1917) and 0 otherwise. Although I acknowledge that the use of a period effect to capture the essence of nationalism may be limited, Hannan and Carroll stated that "no practical alternative to an indirect approach has yet been advanced (1995: 511) and argued that this is the most "favored method in institutional research" (1995: 539). In fact, both institutional and ecological studies continue to use this method with significant frequency to capture the impact of changes in the institutional environment on organizations (Barron, West, & Hannan, 1994; Carroll & Swaminathan, 1991; Dobbin, Sutton, Meyer, & Scott, 1994; Hannan & Freeman, 1987; Mezias, 1990; Olzak & West, 1991; Sutton, Dobbin, Meyer, & Scott, 1994). Attempts were made to derive other indicators of nationalism, but reliable data over the historical period of this study were not available.

In order to overcome this shortcoming, I conducted several qualitative interviews with Finnish historians and scholars of the Finnish press as well as with a high cultural official of Finland who was familiar with the development of the press in a number of European countries. The information gathered from these interviews was helpful in accurately documenting the period of nationalism and in developing and articulating other variables. The detailed information presented earlier about the period of nationalism and its influence on the Finnish press is intended to provide the empirical basis for the models that are tested.

Nationalism as a time-varying construct. After much deliberation and analysis of historical accounts, I constructed the four subperiods of nationalism discussed above in an effort to assess the extent to which the intensity of nationalism varied over time. This does not discount the fact that nation-

FIGURE 1
Newspaper Foundings by Language
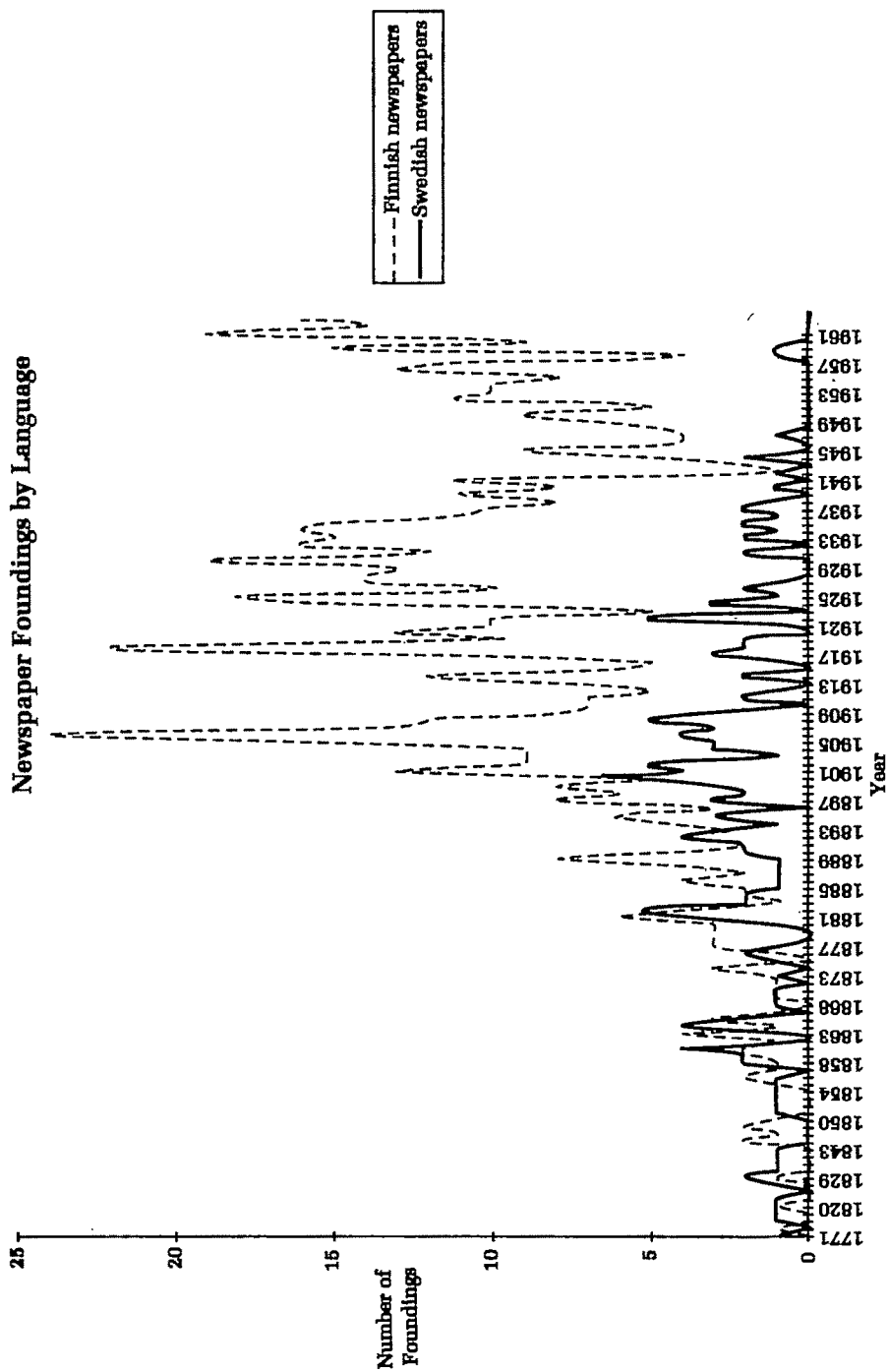
alism is a continuous process. Assigning a beginning and ending date to it was therefore accomplished after much historical analysis and careful interviews. The variables representing the four subperiods were defined as follows: nationalism 1 (1840–62), nationalism 2 (1863–81), nationalism 3 (1882–1904), and nationalism 4 (1905–17), each a dummy variable coded 1 for years within the subperiod and 0 otherwise.

Institutional and market forces. My prediction at the local level of analysis, Hypothesis 2, states that, given the presence of widespread, strong norms for nationalism, the founding rate of Finnish-language papers will increase, even in predominantly Swedish-speaking locales. To test this hypothesis, I created an interaction between nationalism and Swedish-speaking city, a variable that captures whether the populace of a locale was predominantly Swedish speaking (1 indicates Swedish speakers exceeded Finnish speakers, 0 indicates otherwise). Potential readership has been recognized as the most important indicator of market demand for newspapers (Carroll, 1987; Olzak & West, 1991).[8]

Alternative Processes

Previous research has indicated that a variety of organizational and population characteristics may affect organizational founding. The following section elaborates upon a number of variables whose effects are controlled for in the analyses. The goal is not to develop a perfectly specified model but to control for some important factors whose absence might cast doubt upon the validity of the analyses.

Density dependence. The effects of newspaper density and density squared are controlled for in the analysis of organizational founding rates since the density-dependence model (Carroll & Hannan, 1989; Hannan & Carroll, 1992) has been found to hold across a number of populations. In brief, the argument is that early in the history of an organizational population, founding rates increase with density (the linear term), and in later periods, founding rates decrease with density squared (the quadratic term). The rationale is that in the early period, a high number of organizations increases the legitimacy of an organizational form. After the form is legitimized and generally accepted, the presence of a high number of organizations increases competition and depresses the founding rate. Basically, density-dependence models suggest an inverted U-shaped relation between population density and founding rates. I calculated the number of newspapers publishing in a given year for the entire observation period at both the population and local levels. The density measures were squared to arrive at the density-squared measures. These measures were not rescaled.

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[8] There may be indicators of demand other than the number of Swedish speakers. Unfortunately, consistent information on circulation or other economic activity is not available for the period of nationalism.

Market forces. Most organization theorists posit a positive relationship between the resources available in an environment and founding rates (Pfeffer & Salancik, 1978). To capture the extent of resource minificence or carrying capacity, I included measures of total population and city population. The city population figures provide an important indicator of the size of local markets. I took figures from census reports, rescaled them by dividing by 10,000, and entered them as a step function that changed value at the time of a census report. Total population figures, indicating the munificence of the entire population, were also entered and were updated yearly. Similarly, the numbers of Finnish speakers and Swedish speakers in each city were also controlled for in the local-level analyses to account for differences in consumer preferences in language of publication.

Environmental shocks. An environmental shock variable was constructed to take into consideration periods of exogenous shocks, such as the Years of Oppression (1899–1905), when the tsar tried to revoke Finnish autonomy; World War II (1941–44); the Finnish Civil War (1917–21), fought for Finnish independence from Russia; the Winter War (1939–40), also fought against Russia; and the Great Depression (1930–38). None of these periods of shock overlapped. This variable is important in that there may be decreased resources or economic decline for newspapers during economic downturns or simply greater turbulence and uncertainty during years of war (Carroll & Huo, 1986). Periods of political turbulence can also stimulate organizational foundings (Carroll, 1987; Delacroix & Carroll, 1983). A growing body of literature indicates that exogenous shocks have important implications for organizations (Miner, Amburgey, & Stearns, 1990; Tushman & Anderson, 1986; Tushman & Romanelli, 1985).

Other pressures. Finally, it is important to consider the presence of other institutional pressures that arise from organization-organization relations. As noted, in 1850 the tsarist regime imposed a language decree limiting the content of newspapers publishing in Finnish. In 1863, the statute was repealed, and Finnish and Swedish were given equal status. To assess the coercive pressure of this statute, I used language law, a dummy variable coded 1 for years marked by censorship (1850–65) and 0 otherwise.

Another variable, newspaper density by matching language, was constructed in an attempt to control for mimetic effects. I disaggregated overall density into Finnish- and Swedish-language components. There is a growing body of literature on mimetic isomorphism, or the tendency for organizations to imitate structural features of other organizations that are deemed appropriate in an effort to reduce uncertainty about task requirements (Fligstein, 1985; Haunschild, 1994; Haveman, 1993). In other words, I tried to see if there was an imitation effect above and beyond that of total density. Although it cannot be assured that mimicry actually occurred, an attempt can be made to see if density of a particular form influenced founding with that particular characteristic. According to Scott (1995: 86), density is a measure of prevalence that emphasizes the extent to which an organizational form is legitimate.

Data Structures

Analysis of organizational founding is unique in that the level of analysis is the population instead of the organization. It is the population that experiences founding. This level of analysis is appropriate given that nonevents, or periods of nonfounding, are as important as observed foundings. Since periods of no founding cannot be linked to any specific organization, it follows that the unit of analysis must be the population. Thus, the instantaneous probability of a newspaper's being founded is estimated. Hence, the data are coded as a single series of repeatable events since the population experiences multiple foundings.

The data on organizational founding were also constructed by city. Thus, the location of publication became the unit of analysis: each city was at risk to experience founding. The difference in the data structures between the population and local levels has important methodological consequences. At the local level, the first paper founded in each city was dropped in order to start the series. This practice resulted in a loss of power, but it is a generally accepted research convention (Cox & Oakes, 1984).

Models and Analyses

All of the hypotheses were analyzed dynamically using event-history analysis. I used a multivariate, repeatable point-process model in which the chances of different categories or destinations of dependent variables were treated as competing risks. Thus, at any point, a newspaper was at risk for either one of two destination states of founding (a repeatable event). I used a point-process model as opposed to conventional event-history methods because it is especially well suited for analyzing repeatable events (Amburgey, 1986). The rate of occurrence for these processes was taken as a "log linear" function of the independent variables, calculated as

$$r(t) = \exp(BX),$$

where $r(t)$ is the instantaneous probability of the event, X is a vector of independent variables, and B is a vector of coefficients for the independent variables. Thus, the rate of occurrence of the dependent variable is an exponential function of covariates and associated parameter values. Although chi-square indices are given for each model tested, it is not useful to compare across models unless they are hierarchically nested.

I obtained parameter estimates for each model tested by using a maximum-likelihood method in the RATE program designed by Tuma (1982). Since previous research on this data set (Amburgey et al., 1988; Amburgey, Kelly, & Barnett, 1993; Miner et al., 1990) has failed to support the notion of age parametric dependence, simple, exponential models were used. I evaluated significance levels by examining Fs for each of the coefficients.

RESULTS

The hypotheses contain predictions regarding the influence of sociocultural norms on organizational founding at the population and local levels of

analysis. Hypotheses 1 and 2 deal respectively with the general and inter-active effects of nationalism on founding rates. Table 1 presents the findings for the population-level model, and Table 2 presents the local-level model.

Hypothesis 1 predicts that the presence of sociocultural norms for publishing in Finnish would lead to a greater founding rate for Finnish-language newspapers than for Swedish-language newspapers during the period of nationalism. In the population-level model presented in Table 1, nationalism has a significant, positive effect on the founding rate of papers published in Finnish, thereby providing support for Hypothesis 1.

Hypothesis 2 predicts that, given the presence of widespread norms for nationalism, the founding rate of Finnish-language papers would be greater than that of Swedish-language papers even in predominantly Swedish-speaking cities. The parameters reported in Table 2 provide strong support for this prediction. On its own, nationalism has an independent significant and positive effect on Finnish-language newspapers. Swedish-speaking city (the variable that captures whether a populace was predominantly Swedish speaking) has a significant, positive effect on the founding rate of publications in the Swedish language. Hypothesis 2 was tested by examining the effect of the interaction of these two variables on Finnish-language newspapers.

The presence of the nationalism norm in predominantly Swedish-speaking cities served to increase the founding of Finnish-language news-

TABLE 1
Effects of Nationalism: Population-Level Analysis[a]

Variables	Finnish-Language Newspapers	Swedish-Language Newspapers
Density at birth	0.056*	0.0018*
	(0.009)	(0.012)
Density at birth squared	−0.00002	−0.00002
	(0.00001)	(0.00001)
Total population	−0.002*	−0.002†
	(0.00004)	(0.00009)
Environmental shocks	0.019	0.372*
	(0.034)	(0.192)
Newspaper density by matching language	0.038†	0.116†
	(0.013)	(0.025)
Language law	−0.028	0.108†
	(0.332)	(0.366)
Nationalism	0.668*	−0.49
	(0.117)	(0.346)
χ^2	1,153.77	168.91
df	7	7
Number of events	789	162

* Standard errors are given in parentheses.
† $p < .10$
* $p < .05$

TABLE 2
Effects of Nationalism: Local-Level Analysis[a]

Variables	Finnish-Language Newspapers	Swedish-Language Newspapers
Density at birth	0.008†	0.0114
	(0.0003)	(0.0)
Density at birth squared	–0.00003†	–0.0001*
	(0.000001)	(0.00004)
City population	–0.043*	0.038*
	(0.001)	(0.019)
Number of Finnish speakers by city	0.00003*	0.00003†
	(0.000006)	(0.00002)
Number of Swedish speakers by city	–0.000006	–0.00002
	(0.000006)	(0.00002)
Environmental shocks	0.243*	0.358
	(0.089)	(0.220)
Newspaper density by matching language	0.238†	0.405*
	(0.022)	(0.058)
Language law	–0.408	0.231
	(0.371)	(0.367)
Swedish-speaking city	–0.039	2.465*
	(0.247)	(0.562)
Nationalism	0.371*	–0.091
	(0.149)	(0.420)
Nationalism × Swedish-speaking city	0.570*	–1.282*
	(0.284)	(0.552)
χ^2	590.37	492.96
df	11	11
Number of events	617	143

[a] Standard errors are given in parentheses.
† $p < .10$
* $p < .05$

papers while depressing the founding of Swedish-language newspapers. The presence of this strong interaction term makes it clear that it is not simply economic factors such as potential readership (i.e., the number of Swedish speakers in Swedish cities) that drive the founding process. This finding indicates that institutional pressures in the form of the nationalism norm had a significant impact on founding rates over and above economic factors such as competitive intensity (as represented by density) as well resource munificence and consumer preferences (as captured by city population and the breakdowns of the language spoken by geographic locale).

A number of control variables were included in the both the population- and local-level models presented in Tables 1 and 2. The most important were those of newspaper density and density squared since density dependence has been shown to be robust across a number of organizational populations (Hannan & Carroll, 1992). The legitimation effect of density was observed at the population level for both Finnish- and Swedish-language newspapers.

However, the quadratic or competitive effect for both types of newspapers was not significant. Thus, the competitive effects of density as suggested by density-dependence theorists was not supported at the population level.

At the local level of analysis, the curvilinear relationship of density and density squared had the predicted relationship for the founding rates of Finnish-language newspapers but not for Swedish-language papers. For Swedish-language newspapers, the linear term of density did not have a significant effect on founding. One explanation for these findings may be the fact that I included matching density (a variable that captures the number of existing organizations by language type) in the same model as the linear and quadratic terms for density. Both Singh (1993) and Baum (1996) addressed issues related to the questionable robustness of density dependence when modeled with other aspects of density dynamics.

Total population had a significant, negative effect on the founding rate of both Finnish- and Swedish-language newspapers. At the local level of analysis (Table 2) city population increased the founding rate of Swedish-language newspapers but had a significant, negative effect on the founding rate of newspapers published in Finnish. This was likely a "big city" effect: larger cities were more likely to see foundings of Swedish-language news-papers, consistent with the distribution of the population.

At the population level of analysis, the variable for environmental shocks had a significant, positive effect on newspapers published in Swed-ish. At the local level of analysis, shocks had no effect on Swedish-language papers but had a significant and positive impact on the Finnish-language press. These results are generally consistent with earlier findings that dem-onstrate the stimulating effect of political turbulence on newspaper founding (Carroll, 1987).

Interestingly, at the population level of analysis, the language law had a significant, positive effect on the founding rate of Swedish-language news-papers. The effect of newspaper density by matching language was also positive and significant for both language types, indicating a pattern consis-tent with mimicry. Although the results of the analysis of matching density are consistent with a pattern of imitation, these results are also consistent with other economy-wide factors, such as the overall level of economic activity.

Hypothesis 3 deals with the specific effect of nationalism on founding as it varied temporally across the period of nationalism. Like Tables 1 and 2, Tables 3 and 4 report results in which nationalism is divided into the four subperiods. The first column of each table shows parameters associated with the founding of Finnish-language newspapers, and the second column pro-vides similar data for Swedish-language newspapers.

Hypothesis 3 predicts that the founding rate of Finnish-language news-papers as compared to Swedish-language newspapers will be greater during the second and fourth subperiods of nationalism. In the population-level model (Table 3), each subperiod of nationalism has a significant, positive effect on the founding of Finnish-language newspapers, but these effects

TABLE 3.
Effects of Nationalism Intensity: Population-Level Analysis[a]

Variables	Finnish-Language Newspapers	Swedish-Language Newspapers
Density at birth	0.050*	−0.005
	(0.012)	(0.015)
Density at birth squared	−0.00007*	−0.00002
	(0.00002)	(0.00006)
Total population	−0.002*	−0.001
	(0.0004)	(0.0009)
Environmental shocks	0.128	0.372*
	(0.084)	(0.199)
Newspaper density by matching language	−0.016	0.138*
	(0.016)	(0.039)
Language law	−0.002	1.447*
	(0.443)	(0.466)
Nationalism 1	1.226*	−0.537
	(0.490)	(0.596)
Nationalism 2	1.518*	0.143
	(0.269)	(0.431)
Nationalism 3	1.013*	−0.344
	(0.233)	(0.521)
Nationalism 4	0.631*	0.029
	(0.146)	(0.377)
χ^2	1,166.22	173.93
df	10	10
Number of events	789	162

[a] Standard errors are given in parentheses.
* $p < .05$

differ in intensity. The most intense effect is for subperiod 2. No effects of nationalism on Swedish-language newspapers emerge in this model.

At the local level of analysis represented (Table 4), Hypothesis 3 is confirmed in that two subperiods (nationalism 2 and 4) have positive effects on the founding rate of Finnish-language newspapers, and one subperiod (nationalism 1) had a negative, significant effect on Swedish-language newspapers. Overall then, at the local level, three subperiods have positive effects for the Finnish-language press. The intense presence of nationalism in subperiods 2 and 4 increased the founding rate of Finnish-language newspapers, and subperiod 1 saw depression of the founding rate of their competitors, Swedish-language papers.

By entering the subperiods, I allowed for variation in the intensity of nationalism and could further explore when and how the interaction between nationalism and Swedish-speaking cities actually works (Table 2). I know that this interaction could be accounted for by the data from the second and fourth subperiods only, as nationalism was not significant in both of the other subperiods. It was also not uniform in that there were differences between what was going on for Finnish- and Swedish-language newspapers.

TABLE 4
Effects of Nationalism Intensity: Local-Level Analysis[a]

Variables	Finnish-Language Newspapers	Swedish-Language Newspapers
Density at birth	0.014*	−0.004
	(0.005)	(0.009)
Density at birth squared	−0.00005*	−0.0006
	(0.00002)	(0.00004)
City population	−0.041*	0.021
	(0.010)	(0.016)
Number of Finnish speakers	0.00002*	0.00002*
by city	(0.000005)	(0.00001)
Number of Swedish speakers	−0.0000002	0.00001
by city	(0.000006)	(0.00001)
Environmental shocks	0.273*	0.216
	(0.090)	(0.221)
Newspaper density by	0.233*	0.517*
matching language	(0.022)	(0.064)
Language law	−0.665*	0.724
	(0.612)	(0.477)
Nationalism 1	1.040	−1.277*
	(0.683)	(0.623)
Nationalism 2	0.709*	−0.567
	(0.338)	(0.393)
Nationalism 3	0.351	−0.428
	(0.232)	(0.433)
Nationalism 4	0.340*	0.291
	(0.144)	(0.387)
χ^2	581.73	480.63
df	12	12
Number of events	617	143

[a] Standard errors are given in parentheses.
* $p < .05$

At the local level of analysis, entering a single dummy specification to cover the entire period of nationalism, as was done in the models shown in Table 2, might have led to my missing important information, since only two subperiods actually had an effect. Additionally, nationalism 2 is stronger in intensity than nationalism 4. Interestingly, it was only the initial period of nationalism that depressed the founding rate of Swedish-language newspapers; after that, the impact of nationalism was on Finnish-language newspapers. There was also no significant effect for either language type in subperiod 3.

At both the population and local levels of analysis, the curvilinear relationship of density and density squared had the predicted relationship for the founding rates of Finnish-language newspapers but not for Swedish-language papers. The effects of environmental shocks are the same in Tables 3 and 4 as they are in Tables 1 and 2. Shock continues to stimulate Swedish-language foundings at the population level of analysis and Finnish-language foundings at the local level.

The effect of the language law on Swedish-language newspapers remained unchanged at both levels of analysis. An interesting finding displayed in Table 4 concerns the effect of the language law on the founding rate of Finnish-language newspapers. Although the language law was non-significant for Finnish-language newspapers at both levels of analysis in the earlier models, in this model it has a significant, negative effect on Finnish-language newspapers at the local level. This is interesting in that earlier research (Amburgey et al., 1988) did not find any support for suppression of the press during the period of the language law.

DISCUSSION

This study sought to address the power of institutional norms on the founding rates of an organizational population over time. The findings demonstrate that organizations did adopt institutionally prescribed characteristics and that institutional pressures were more important in determining isomorphism than market forces during the period of nationalism. In addition, consistent with historical accounts of the period examined, institutional norms did vary in intensity over time.

The Power of Institutional Norms

Institutional and economic forces. Institutional pressures influenced the language of publication chosen by a newspaper at the time of founding in a manner consistent with and endorsed by the nationalism norm. Nationalism had a significant and positive effect on the founding rates of Finnish-language newspapers at both the population and local levels of analysis. More importantly, the interaction of the variables nationalism and Swedish-speaking city was positive and significant for foundings of Finnish-language papers at the same time it was significant and negative for foundings of Swedish-language newspapers. This finding means that conditions of nationalism stimulated the founding of Finnish-language papers while suppressing the founding of Swedish-language papers, even in predominantly Swedish-speaking cities.

As noted earlier, economic arguments would suggest that there would be greater demand for Swedish-language newspapers in predominantly Swedish-speaking locales. The powerful effect of nationalism at the local geographic level in Swedish-speaking cities suggests that institutional factors explain variance over and above that explained by economic variables such as competition and demand. Since there was a significant effect on the rate of founding of Finnish-language newspapers during the period of nationalism, it may be that during highly normative periods, institutional processes accelerated whatever economic processes may have been occurring.

The presence of strong institutional norms has two primary effects on the founding process. The first is cognitive. Institutional pressures cause

organizations to incorporate institutionally favored characteristics and become isomorphic in the hopes of being judged as appropriate or legitimate. Second, institutional forces have important resource consequences for organizations by altering tastes and preferences as they relate to economic activity. In this regard, the effect of institutional norms is more exchange-driven.

My findings are consistent with both effects. Norms of nationalism increased the founding rate of Finnish-language newspapers in general. This result is consistent with a cognitive explanation and explains the adoption of legitimated or institutionally favored characteristics. Institutional forces, as represented by nationalism, were also important in circumstances in which market forces, as represented by the presence of a viable local market, would predict otherwise. In fact, nationalism norms accounted for a significant amount of variance after I controlled for market forces such as competitive intensity, resource munificence, and consumer preferences. This finding demonstrates the existence of a circumstance in which institutional forces operated with strong resonance.

Economics-based arguments don't traditionally take into account changes in the institutional environment, such as changes in historical, cultural, or normative forces (Hirsch et al., 1990). Tastes and preferences are exogenous and are most often treated as given. Given their authoritarian stance (see Stigler and Becker [1977] for an example), economists have often been charged with being "undersocialized" (Granovetter, 1985). These findings suggest an important boundary for economic arguments; it appears that it is important to recognize that other considerations, such as institutional ones, may sometimes be as important as market forces.

Variation in normative intensity and levels of analysis. The results demonstrate both similarities and differences between findings at the population and local levels of analysis. First, the effect of nationalism on founding was positive and significant for the founding rate of Finnish-language newspapers at both levels of analysis. Interestingly, at the the local level of analysis the presence of nationalism during one period suppressed the entry of competitors, but an increase in the creation of Finnish-language newspapers is observed in other periods. Thus, the effect of nationalism was not uniform across Finnish- and Swedish-language newspapers. It varied over time and by newspaper type. This finding highlights both the importance of trying to explain the variation of norms across time and the necessity of conducting finer-grained analysis at the appropriate level. In this case, the specification of different and additional local-level variables permitted more precise insights as to the nature and power of these norms during this period.

Second, the effects of density dependence varied by level of analysis and newspaper type. Processes of legitimation were observed at the population level of analysis for both types of newspapers. This result is consistent with Hannan and colleagues' (1995) departure from traditional density-dependence logic in suggesting that institutional forces of legitimation are perhaps global.

Finnish-language newspapers were affected by both legitimation and competition processes at the local level. Thus, for Finnish-language newspapers at the local level, both legitimation and competition processes of density operated in a manner consistent with traditional density-dependence arguments.

The local-level analyses make two important contributions. First, conducting analyses at both population and local levels affords more precise and appropriate model specification. The ability to disaggregate the population by geographic region overcomes an important limitation in density-dependence theory, whose advocates have tended to assume that the intensity of competition among geographically distant members of a population is equivalent (Baum, 1996). Since newspapers depend on the viability of local markets, reliance on this assumption from density dependence would tend to misrepresent the importance of the competitive processes operating in this population. Thus, the density-dependence findings with respect to competitive processes are likely to be more valid at the local level. Second, given the differences observed between Finnish- and Swedish-language newspapers, these findings demonstrate that processes of density (legitimation and competition) can have particularistic effects on members of the same organizational population.

Institutional pressures and founding. The process involved in the creation of new organizations is markedly different from the resource acquisition or maintenance process for existing organizations. At the time of creation, founders' efforts involve making claims and promises about the future. The organizations as yet have no history—therefore, entrepreneurs and founders expend a great deal of effort in making the future seem plausible in order to establish their organizations as legitimate subunits of the larger social system (Meyer & Rowan, 1977).

In lieu of tangible evidence to prove viability, there is a tendency to fall back on socially constructed accounts of legitimacy. Thus, it is imperative at the time of creation to achieve a fit with prevailing institutional practices and norms. In a study of the early period of the American automobile industry, Rao (1994) found that issues of legitimacy were likely to be of paramount importance both prior to creation and early in the life of an organization. Organizations that incorporate normative elements into their structures gain legitimacy, which translates into increased access to much-needed resources. Normative factors are more consequential for founding because conformity to norms takes on greater significance when establishing the legitimacy of nonexistent organizations. Once an organization establishes its existence, other forces may come to predominate. For a newspaper, these may include ties to other organizations that buffer it, its content or coverage, and its performance in terms of delivery of service (Miner et al., 1990).

The findings of this study show a significant effect of broad-based institutional pressures on organizational founding. In an analysis not reported here, institutional processes did not protect newspapers from failure. Thus, the legitimacy imperative of conformity to institutional norms may be espe-

cially relevant for creation but not so critical for survival in the case of this population.

Limitations

Although the findings reported here make an important contribution to the institutional theory literature, the study and measures are not without limitations. One limitation is that data on size or circulation by newspaper are simply not available. However, this is not as significant a problem for analysis of founding rates as it would be for failure analyses. Second, the categorical measure used to assess the presence of the nationalism norm may not fully capture the complexity present in the organizations' normative environment. The use of period effects to measure institutional forces is conventional in ecological (Barton et al., 1994; Carroll & Swaminathan, 1991; Hannan & Freeman, 1987) and institutional research (Dobbin et al., 1994; Mezias, 1990; Olzak & West, 1991; Sutton et al., 1994). Thus, the measurement used in this study is consistent with current practice. However, this limitation is important because of the likelihood that institutional pressures are continuous over time. In an attempt to overcome this limitation, I conducted several qualitative interviews with Finnish historians, scholars, and government representatives of the Finnish press to construct valid historical accounts that documented the period of Finnish nationalism.

Implications and Future Directions

The findings of this study demonstrate the significant effect of broadly based sociocultural norms on the organizational entry process and the power with which these prescriptions influence organizations over time, across levels of analysis, and as a function of the interplay of ecological, economic, and proximal sources of institutional expectations.

The findings have a number of implications. First, it was shown that at the level of the microenvironment, institutional forces are likely to operate in concert with other processes, whether they be economic or political, and that under certain conditions, institutional forces may even dominate these other forces. However, institutional forces as represented by nationalism were more important when market forces as represented by the presence of a viable local market would predict otherwise. In fact, the effect of institutional pressures was significant even after market forces of competition, carrying capacity, and demand were factored out. This finding suggests that institutional factors may explain additional variance over and above that predicted by economic variables. However, institutional pressures do not necessarily supplant alternative processes. Rather, all pressures coexist and complement each other.

A second important implication for organizational ecology is further empirical support for the density-dependence model. These findings demonstrate the particularistic effects of density on organizational members of the same population. A final implication deals with the importance of de-

voting attention to variation in institutional norms across time. Local-level analysis permitted finer-grained consideration of this variation.

There are a number of possible avenues for future research on the influence of institutional forces on pressures for isomorphism. A focus on finer-grained measures is imperative in further research. Future research also needs to study the broad spectrum of institutional forces at appropriate levels of analysis. Sociocultural expectations may have a more broadly based influence than has been postulated, requiring analysis at both local and population levels. However, institutional processes involving connectedness with other organizations may operate more at the level of the microenvironment. Finally, this study demonstrates the need to continue exploration of the power and prescription of institutional norms across a variety of circumstances and over time.

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PERCEIVED ORGANIZATIONAL SUPPORT AND LEADER-MEMBER EXCHANGE: A SOCIAL EXCHANGE PERSPECTIVE

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Employees develop exchange relationships both with organizations and immediate superiors, as evidenced by research on perceived organizational support (POS) and leader-member exchange (LMX), respectively. Despite conceptual similarities between these two constructs, theoretical development and research has proceeded independently. In an attempt to integrate these literatures, we developed and tested a model of the antecedents and consequences of POS and LMX, based on social exchange theory. Results indicated that POS and LMX have unique antecedents and are differentially related to outcome variables, providing support for the importance of both types of exchanges.

Researchers have been increasingly interested in the role of exchange processes in organizations (Rousseau, 1990; Rousseau & Parks, 1993). A framework underlying much of the research in this area is social exchange theory. As described by Blau (1964), social exchanges entail unspecified obligations; when one person does another a favor, there is an expectation of some future return, though exactly when it will occur and in what form is often unclear (Gouldner, 1960). Employees tend to take a long-term approach to social exchange relationships at work, with the pattern of reciprocity over time determining the perceived balance in exchanges (Blau, 1964; Rousseau, 1989). Two types of social exchanges have been studied in recent years. Exchanges between an employee and employing organization are called perceived organizational support (POS; Eisenberger, Huntington, Hutchison, & Sowa, 1986). Exchanges between the employee and his or her leader (supervisor) are referred to as leader-member exchange (LMX); Graen & Scandura, 1987). Despite conceptual similarities between POS and LMX,

researchers have not yet attempted to integrate these two literatures. Thus, it is unclear whether POS and LMX are distinct and whether they have different effects on employee attitudes and behaviors.

Eisenberger and colleagues (1986) developed the concept of POS to explain the development of employee commitment to an organization. They proposed that "employees develop global beliefs concerning the extent to which the organization values their contributions and cares about their well-being" (1986: 501), and they refer to those global beliefs as perceived organizational support. Adopting a social exchange framework, Eisenberger and colleagues argued that such beliefs underlie employees' inferences concerning their organizations' commitment to them (POS), which in turn contribute to the employees' commitment to their organizations. High levels of POS create feelings of obligation, whereby employees not only feel that they ought to be committed to their employers, but also feel an obligation to return the employers' commitment by engaging in behaviors that support organizational goals. That is, employees seek a balance in their exchange relationships with organizations by having attitudes and behaviors commensurate with the degree of employer commitment to them as individuals. For example, research has shown that POS is positively related to conscientiousness in performing job responsibilities and to commitment and innovation (Eisenberger, Fasolo, & Davis-LaMastro, 1990). Perceptions of being valued and cared about by an organization also enhance employees' trust that the organization will fulfill its exchange obligations of recognizing and rewarding desired employee attitudes and behavior. Such rewards may be informal (e.g., praise, mentoring) or formal (promotions, salary increases).

Because POS is a somewhat new concept, questions about its distinctiveness from other concepts have been raised (Shore & Tetrick, 1991). Studies have shown that POS is distinct from perceived supervisor support (Kottke & Sharafinski, 1988), organizational politics (Randall, Cropanzano, Bormann, & Birjulin, 1994), and organizational commitment (Shore & Tetrick, 1991). One issue that has not been addressed in the literature is whether POS is distinct from organizational climate. Even though both constructs concern work environment issues, conceptually the two constructs are distinct. POS is based on the particular work history of an employee and represents his or her perception of the extent to which the employer is committed to him or her as an individual; organizational climate reflects individuals' interpretations of a work environment they share with others (Kopelman, Brief, & Guzzo, 1990).

Social exchange theory provides the dominant theoretical basis for LMX as well (Sparrowe & Liden, 1997). Leader-member exchange theory suggests that an interpersonal relationship evolves between supervisors and subordinates against the background of a formal organization (Graen & Cashman, 1975). The relationship is based on social exchange, wherein "each party must offer something the other party sees as valuable and each party must see the exchange as reasonably equitable or fair" (Graen & Scandura, 1987: 182). LMX relationships have been shown to vary in terms of the

amounts of material resources, information, and support exchanged between the two parties. The greater the perceived value of the tangible and intangible commodities exchanged, the higher the quality of the LMX relationship. Prior research has found quality of exchange to be related to important leader and subordinate behaviors. For example, LMX has been positively related to job attitudes and performance evaluations (Dienesch & Liden, 1986, Liden, Sparrowe, & Wayne, 1997).

Given that POS and LMX are both based on social exchange and have much in common, there is a question as to whether they are conceptually distinct. Unfortunately, prior researchers have not attempted to theoretically integrate the POS and LMX literatures or to empirically examine these two types of exchanges concurrently. It is important to examine the distinctiveness of POS and LMX in order to determine whether each stream of research makes a unique contribution to the literature. For example, if an employee's exchange with a leader rather than his or her exchange with an organization is more strongly related to employee attitudes and behaviors, future research should focus on LMX rather than POS. Conversely, if POS and LMX are related to different employee attitudes and behaviors, the results have implications for how organizations might change these outcomes. For example, if POS is more strongly related to intentions to leave a job than is LMX, efforts to improve the exchange relationship between employee and leader made in the hope of reducing turnover may be ineffective.

The purpose of this study was to explore the distinctiveness of POS and LMX and to examine links between these two forms of social exchange and employee outcomes. We developed and tested a conceptual model integrating POS and LMX. Drawing on social exchange theory and conceptual work on POS and LMX, we argued that POS and LMX are interrelated, yet have unique antecedents and outcomes. Thus, we explored the proposition that both types of social exchanges, perceived organizational support and leader-member exchange, are salient and differentially related to particular employee attitudes and behaviors.

MODEL OF PERCEIVED ORGANIZATIONAL SUPPORT AND LEADER-MEMBER EXCHANGE

The model shown in Figure 1 includes antecedents and outcomes of both constructs. Organizational tenure and dyad tenure serve as control variables representing the duration of each exchange relationship. We identified developmental experiences and promotions as two key determinants of POS. For LMX, superiors' liking and expectations of subordinates were examined as antecedents. We proposed a reciprocal relationship between LMX and POS and predicted that they would both influence performance ratings and organizational citizenship behavior. However, we hypothesized that only POS would be related to affective commitment and intentions to quit, whereas only LMX would be associated with doing favors for the leader. Finally, two additional paths were based on prior research: a path

from affective commitment (an employee's emotional attachment to an organization and identification with its goals [Meyer & Allen, 1984]) to intentions to quit (e.g., Mathieu & Zajac, 1990), and a path from organizational citizenship behavior to performance ratings (e.g., MacKenzie, Podsakoff, & Fetter, 1991).

Distinctiveness of POS and LMX

Factor analysis results showing that perceptions of supervisor support and organizational support load on separate factors (Kottke & Sharafinski, 1988) are consistent with the view that POS and LMX are distinct constructs. Similarly, using data from two independent field sites, Herold, Liden, and Leatherwood (1987) found through factor analysis that the amount, usefulness, and consistency of feedback received from an organization are separate from the amount, usefulness, and consistency of feedback received from a leader. In fact, the correlation between these two sources of feedback was only .16. Thus, even though leaders are important organizational representatives, employees appear to view exchanges with an organization and a leader as distinct.

Gouldner's (1960) conceptual work on the norm of reciprocity provides another basis for distinguishing between POS and LMX. According to Gouldner, the norm of reciprocity is based on two assumptions: "(1) people should help those who have helped them, and (2) people should not injure those who have helped them" (1960: 171). He further argued that the reciprocity norm provides stability in social relationships that goes beyond the requirements. That is, social roles require compliance by all who hold a particular role. So, for example, a supervisor and subordinate are required to carry out certain types of duties regardless of the quality of their particular dyadic relationship. In contrast, Gouldner suggested that the generalized norm of reciprocity creates obligations toward another when that party has engaged in previous behavior that was beneficial to the recipient. A recipient is indebted to a donor until the obligation is repaid and may not harm the donor while under such an obligation. This formulation suggests that feelings of obligation are created when a party acts in a manner that is beneficial to another and when those actions go beyond the demands of a social role.

In terms of the leader-member relationship, Gouldner's framework suggests that when a leader or employee provides benefits to the other party that the provider's work role does not mandate, reciprocity should come into play. In a high-quality exchange relationship, the employee would feel obligated not only to perform the job adequately, but also to engage in behaviors that directly benefit the leader and are beyond the scope of usual job expectations. Likewise, the leader would feel obligated to reciprocate such actions by providing the employee with rewards and privileges.

The nature of reciprocity is somewhat different in the employee-organization exchange. In this case, since the organization is made up of many individuals, the employee does not have a relationship with one individual representing the "organization" that is comparable to the relationship with

FIGURE 1
Hypothesized Model[a]
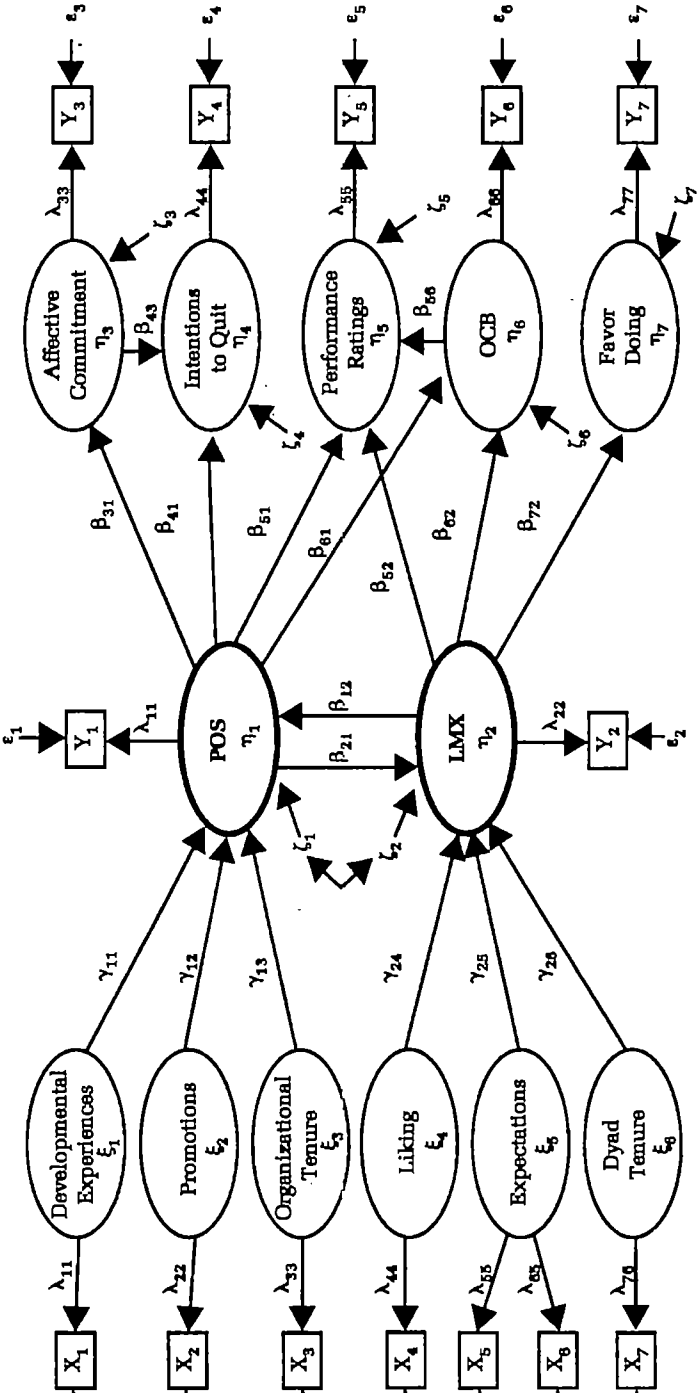
[a]To simplify presentation of the model, correlations among the exogenous variables are not shown.

the leader. Nonetheless, employees consider the organization to be an entity with which they have exchange relationships (Rousseau, 1990; Shore & Tetrick, 1994). We contend that the feelings of obligation underlying POS are based on a history of organizational decisions, some of which were made by an individual employee's immediate superior, others of which were made by past superiors, and still others, by higher-level superiors who did not supervise the focal employee directly. For example, an employee's rapid rate of promotion would be based on the decisions of many superiors. Such a history of rewards would generate feelings of obligation toward the organization as a whole, since a variety of organizational representatives contributed to the rewarding experiences.

Antecedents of POS

Eisenberger and colleagues (1986) argued that employees develop perceptions of organizational support because people tend to ascribe traits or qualities to organizations through a process of "personification" (Levinson, 1965). This personification of an employer by an employee represents an accumulation over time of rewards and punishments the employee has received from other, more powerful organization members. Further, for POS to be enhanced, the employee must view the organization's actions in relation to him- or herself as discretionary and as reflecting positive evaluations (Eisenberger et al., 1986; Shore & Shore, 1995). Thus, we expected that an employee's history of rewards, which result from various human resource practices and decisions, would contribute to perceived organizational support.

This expectation raises questions as to what underlying processes lead employees to interpret certain human resource decisions as indicative of organizational support. According to signaling theory, early job assignments, promotions, and other organizational experiences based on human resource decisions serve as signals about an employee's potential (Sheridan, Slocum, Buda, & Thompson, 1990). Sheridan and colleagues noted that "signaling theory suggests that the special career histories of sponsored individuals place them at an advantage during personnel selection decisions. Sponsored individuals thus receive the added benefit of a self-fulfilling inference made by senior managers" (1990: 579). As employees observe that there are links between human resource decisions and valued rewards, they will likely view these decisions as meaningful indicators of future organizational support. This view is consistent with feedback theory, which suggests that individuals are particularly likely to seek and attend to information that is relevant to important personal goals (Ashford & Cummings, 1983), such as career opportunities and continued employment. Therefore, we expected that employees would associate some types of human resource decisions with perceived organizational support.

Shore and Shore (1995) identified two key types of human resource practices that are related to POS: (1) discretionary practices that imply investment by the organization in an employee (e.g., time off for education)

and (2) organizational recognition (e.g., salary increases). Of particular importance is that individuals view a practice as indicating positive evaluations of themselves by the organization. Benefits available to all employees regardless of performance (e.g., retirement benefits) would not be associated with POS (Shore & Shore, 1995). One type of discretionary organizational investment is providing an employee with formal and informal training and development, which we refer to as developmental experiences. We expected that greater levels of participation in developmental experiences would be positively related to POS. Similarly, an organization may recognize employee accomplishments in a number of ways. Perhaps the most salient to an employee is to be promoted to a higher position, an advancement typically associated with an increase in salary. Again, taking a signaling theory perspective, we expected that employees who received more promotions than others would perceive higher levels of organization support.

> *Hypothesis 1: Numbers of developmental experiences and promotions will be positively related to perceived organizational support.*

Antecedents of LMX

Although very little research has examined the antecedents of POS, prior studies have been conducted on the determinants of the quality of leader-member exchange. Given the purpose of integrating POS and LMX, constructs that have previously been studied separately, we chose antecedents of LMX that have been examined in previous research. Using past empirical results on the antecedents of LMX as a baseline allows for more meaningful tests of variables thought to influence only one or the other construct.

Degree of mutual liking has been established as a critical, if not dominant, variable in the study of interpersonal interaction (Zajonc, 1980). Consistent with research on the influence of liking in dyadic relations (Byrne, 1971), investigations conducted by organizational researchers have shown that liking influences relationships that develop between leaders and their followers. Liking has been found to be a significant predictor of LMX in laboratory experiments (Dockery & Steiner, 1990; Wayne & Ferris, 1990) and field studies (Liden, Wayne, & Stilwell, 1993; Wayne & Ferris, 1990). Thus, we expected that leader liking of a subordinate would be related to the subordinate's perceptions of the quality of leader-member exchange.

We also predicted that leader expectations of subordinates would be related to LMX quality. Beginning with the pioneering work of Merton (1948), a large body of research has demonstrated the power of expectations over behavior. Studies conducted in educational settings on the self-fulfilling prophecy, or Pygmalion effect, have shown that bogus expectations provided to teachers lead to significantly higher actual performance among students labeled as having greater potential than other students (Rosenthal & Rubin, 1978). Similar results have been found in military (Eden & Shani,

1982) and business settings (Hogan, 1987; Phillips & Dipboye, 1989; Sutton & Woodman, 1989). More specifically, leader expectations of subordinates established and expressed during the first few days of working together have been shown to be related to subordinate perceptions of the quality of leader-member exchange six months later (Liden et al., 1993).

Leaders' expectations alter their perceptions of subordinates. Leaders holding high expectations of subordinates may be more likely to attribute their good behavior to their internal qualities and poor behavior to forces external to them, whereas attributions would be the reverse when the leaders have low expectations of the subordinates (Heneman, Greenberger, & Anonyuo, 1989). Leaders' expectations may also influence their behavior toward members. High leader expectations for a subordinate may translate into the provision of challenging tasks, feedback, and training. Conversely, a subordinate of whom a leader has low expectations may be left with relatively routine tasks, little feedback, and few training opportunities (Feldman, 1986; Leana, 1986).

As Liden and colleagues (1993) suggested, the self-fulfilling prophecy may also influence the quality of leader-member exchange. Specifically, leaders may provide more "time, attention, feedback, and encouragement" to subordinates of whom they have higher expectations (Feldman, 1986: 174). Thus, in an attempt to influence the fulfillment of expectations, leaders might enhance LMX relationships with "high-expectation" subordinates.

> *Hypothesis 2: Leader liking and expectations of an employee will be positively related to leader-member exchange quality.*

Relationship between POS and LMX

Although we argue that POS and LMX are distinct conceptually, we acknowledge that they should be empirically related. The issue of whether LMX is antecedent to POS, or vice versa, arises. Logically, it could be argued that LMX is a predictor of POS. Eisenberger and colleagues (1986) theorized that discretionary rewards linked with job performance were particularly likely to affect POS. Given that leaders are often charged with administering such rewards, and also that empirical research has shown that POS is associated with leader support (Tetrick, Shore, & Miles, 1994), LMX may contribute to POS. In support of this view, Sheridan and colleagues' (1990) research based on signaling theory suggests that employees with certain types of early career experiences are more likely than others to be sponsored by senior managers and in turn receive more promotions and transfers and larger raises. Thus, POS is based on a history of rewards that may be administered by an immediate superior (past or present) as well as by managers at higher organizational levels.

However, it could also be argued that POS contributes to LMX. Specifically, employees who have a history of feeling supported by an organization may be more likely than others to develop high-quality exchange relation-

ships with their leaders. As noted, research on the Pygmalion effect (Eden, 1992; Harris & Rosenthal, 1985) suggests that leaders' expectations contribute to differential treatment of employees. Leaders' more positive expectations of successful employees (i.e., those who have been supported by the organization in the past) would lead to higher levels of LMS (Liden et al., 1993).

> *Hypothesis 3: There will be a positive, reciprocal relationship between leader-member exchange and perceived organizational support.*

Consequences of POS and LMX

The final portion of the model addresses the relative importance of the effects of the two constructs on employee attitudes and behaviors. The focus of nearly all research on perceived organizational support and of most research on LMX has been the prediction of salient outcomes. Thus, given our attempt to merge the two streams of research, it is important to understand whether employees' relationships with their organizations (POS), or their relationships with their leaders (LMX), or both are related to specific employee attitudes and behaviors. In developing links with outcomes, we expected that POS would be associated with outcomes that affect an organization as a whole, whereas LMX would be associated with outcomes that affect leaders and immediate work groups.

Following social exchange theory, we predicted that perceived organizational support would contribute to performance and organizational citizenship behavior (OCB) because those behaviors are beneficial to organizations. Employees who feel that they have been well supported by their organizations tend to reciprocate by performing better and engaging more readily in citizenship behavior than those reporting lower levels of POS (Eisenberger et al., 1990; Gouldner, 1960; Shore & Wayne, 1993).

> *Hypothesis 4: Perceived organizational support will be positively related to performance ratings and organizational citizenship behavior.*

At the work group level, similar social exchange processes are in evidence. According to Liden and Graen (1980: 452), employees reporting high-quality LMX relationships make "contributions that go beyond their formal job duties," and those reporting lower-quality LMX "perform the more routine tasks" of a work group. OCB is similarly defined as behavior that goes beyond what is expected on the basis of the formal employment contract (Bateman & Organ, 1983; Organ, 1990). It follows that LMX should be positively related to OCB, and results of field investigations have provided evidence of this correlation (Manogram & Conlon, 1993; Wayne & Green, 1993). Research has also quite consistently shown a positive relation between LMX and performance ratings (Duarte, Goodson, & Klich, 1994; Liden & Graen, 1980; Scandura, Graen, & Novak, 1986; Vecchio & Gobdel, 1984; Wayne &

Ferris, 1990). Subordinates with high-quality LMX relationships may actually perform better because of the added support, feedback, resources, and opportunities provided to them (Feldman, 1986). In addition, leniency bias appears to inflate performance ratings for employees with high-quality LMX relationships (Duarte et al., 1994; Vecchio & Gobdel, 1984). Such bias, whether conscious or not, may represent reciprocation on the part of the leaders in high-quality-LMX dyads. In return for member behaviors that benefit the leader but are not performance-related, such as loyalty and friendship, a leader may rate the member more positively than his or her performance-related behaviors warrant. However, in low-quality LMX relationships, leaders rate members strictly according to established performance standards.

> *Hypothesis 5: Leader-member exchange will be positively related to performance ratings and organizational citizenship behavior.*

Although we expected both perceived organizational support and leader-member exchange to contribute to OCBs and performance ratings, POS should be more strongly related to affective commitment and intentions to quit than is LMX. Eisenberger and colleagues (1986) argued that employees become affectively committed to their organizations because of perceptions that the organizations are committed to them (POS), and several empirical studies have supported the strong relationship between POS and affective commitment (Eisenberger et al., 1990; Shore & Tetrick, 1991; Shore & Wayne, 1993). Similarly, for intentions to quit, an employee who views an employer as low in support would be more likely to seek employment elsewhere (Guzzo, Noonan, & Elron, 1994), perhaps in the hope of receiving greater support.

Leader-member exchange quality has also been shown to be positively related to affective commitment (Manogram & Conlon, 1993; Schriesheim, Neider, Scandura, & Tepper, 1992). Similarly, researchers studying the correlation between LMX quality and intentions to quit have found it to be significant and negative (Major, Kozlowski, Chao, & Gardner, 1995; Sparrowe, 1994; Vecchio & Gobdel, 1984; Wilhelm, Herd, & Steiner, 1993). However, expecting a significant bivariate correlation between variables does not necessarily imply that a significant path should be specified between the same two variables in a structural model. This is because structural equation modeling is a multivariate technique in which the explanatory power of each variable is pitted against that of the other variables in the model. Although LMX quality may be related to commitment and intentions to quit in multivariate tests including both LMX and POS, there is reason to expect that POS will explain more variance in these variables than LMX. One explanation for the expected greater explanatory power of POS is that it is less susceptible to change. LMX is based on the personalities of and interactions between a particular member and leader. If one of the parties in a dyad changes—as when, for instance, a new leader is hired—a new ex-

change relationship develops. POS is based on an employee's entire history with an organization, but LMX is based on subperiods within that history. Thus, an employee's low-quality exchange with his or her leader may not affect commitment and intentions to quit as the employee may view the situation as temporary and expect a change that will disrupt the dyad in the future. These arguments suggest that degree of commitment and intent to stay with an organization should best be predicted by perceptions of support from the organization, rather than by perceptions of support from the leader.

> *Hypothesis 6: Perceived organizational support will be positively related to affective commitment and negatively related to intentions to quit.*

On the basis of social exchange theory, we expected that the quality of exchange that develops between a leader and member will influence the latter's behavior toward the leader. In particular, because leader-member exchange is associated with the leader's providing support and guidance to the member, it is likely that the member will reciprocate by doing favors for the leader. These favors restore balance in the relationship by making the relationship beneficial to the leader. Thus, we predicted that a high-quality leader-member exchange will be related to the subordinate's doing favors for the leader.

> *Hypothesis 7: Leader-member exchange will be positively related to the member's doing favors for the leader.*

METHODS

Participants

The reported research was part of a larger study conducted at a large corporation with over 20,000 employees throughout the United States. A random sample of 1,413 salaried employees with at least five years of tenure was selected to participate in the study. The criterion of five years tenure was used because the larger organizational survey focused on the determinants of career success. Questionnaires were mailed to these employees, and 570 completed them (a 40 percent response rate). In order to examine our model, we also collected data from the employees' direct superiors, or managers. A total of 505 managers received a separate questionnaire, which included questions regarding up to three subordinates. Of the managers, 289 returned the questionnaire (a 57 percent response rate).

We were able to obtain the most recent performance rating for respondents and nonrespondents from company records. The average performance rating (one item, five-point scale) was 3.39 for respondents and 3.32 for nonrespondents ($t = -1.60$, n.s.). The demographic characteristics of the sample used in this study were compared to the demographics of the nonrespondents. There were no significant differences in terms of edu-

cation, gender, and organizational tenure. However, there was a significant difference in race, with the participation rate higher for Caucasians than for other races ($\chi^2_4 = 10.16$, $p < .05$).

Complete data were obtained for 252 leader-member dyads. The employee sample was 95 percent Caucasian and 88 percent male. The average age was 45 years, and the average organizational tenure was 18 years. The manager sample was 98 percent Caucasian and 97 percent male; the average age was 44 years. Employees had worked with their managers an average of 3 years.

Procedures

Questionnaires were mailed to the home addresses of employees and their managers, who were asked to complete them and return them directly to us in postage-paid envelopes that we provided. Participation in the study was voluntary, and confidentiality was assured.

Each survey had an identification number that was used to match employee and manager responses with each other and with data from company records. The organization provided promotion history and demographic information for the responding employees.

Measures

Developmental experiences. We developed four items to measure the formal and informal developmental experiences of employees. Two of the items were "In the positions that I have held at [company name], I have often been given additional challenging assignments" and "In the positions that I have held at [company name], I have often been assigned projects that have enabled me to develop and strengthen new skills." Employees indicated their agreement with these statements on seven-point scales with anchors of "strongly disagree" (1) and "strongly agree" (7). The third and fourth items were "Besides formal training and development opportunities, to what extent have your managers helped to develop your skills by providing you with challenging job assignments?" and "Regardless of [company name]'s policy on training and development, to what extent have your managers made a substantial investment in you by providing formal training and development opportunities?" Employees responded to those items on a seven-point scale ranging from "not at all" (1) to "a very large extent" (7) ($\alpha = .87$).

Promotions. The number of promotions an employee had received between 1987 and 1993 was determined from company records. Promotion was measured as a change in pay grade and represented the employee's movement within the organization over a six-year period.

Organizational tenure. The number of years the employee had been with the company was obtained from company records.

Liking. Liking was measured using three items from Wayne and Ferris (1990): "I think this employee would make a good friend," "I get along well with this employee," and "I like this employee very much." Managers responded on seven-point scales ranging from "strongly disagree" (1) to "strongly agree" (7) ($\alpha = .83$).

Expectations. Each manager was asked to indicate the pay grade he or she thought a focal employee would reach at the end of five years and at the end of his or her career. For both items, expected pay grade was subtracted from the current pay grade to create the expectations measure. The correlation between the items was .86 ($p < .001$).

Perceived organizational support (POS). Employees completed a shortened version of the Survey of Perceived Organizational Support (SPOS; Eisenberger et al., 1986, 1990). We used the nine items of the SPOS scale that loaded highest in Eisenberger et al.'s (1986) factor analysis. This shortened version of the SPOS has been used in previous research (Eisenberger et al., 1990). Employees indicated their degree of agreement to these items on seven-point scales ranging from "strongly disagree" (1) to "strongly agree" (7) ($\alpha = .93$).

Leader-member exchange (LMX). Seven items reported by Scandura and Graen (1984) were used to measure LMX. Employees responded to these items on seven-point scales with anchors of "strongly disagree" (1) and "strongly agree" (7) ($\alpha = .90$).

Affective commitment. A nine-item measure developed by Porter, Steers, Mowday, and Boulian (1974) was used to measure affective commitment. Employees responded on seven-point scales with anchors of "strongly disagree" (1) and "strongly agree" (7). On the basis of the results of principal components analysis, two items were deleted and the remaining seven items were summed to create the scale ($\alpha = .87$).

Intentions to quit. Employees responded to five items designed to assess their intentions to leave the organization. Three of the items were used by Landau and Hammer (1986): "I am actively looking for a job outside [company name]," "As soon as I can find a better job, I'll leave [company name]," and "I am seriously thinking about quitting my job." One item from the Michigan Organizational Assessment Questionnaire (Nadler, Jenkins, Cammann, & Lawler, 1975) was included: "I often think about quitting my job at [company name]," and we developed one item: "I think I will be working at [company name] five years from now" (reverse-scored). Employees responded on seven-point scales with anchors of "strongly disagree" (1) and "strongly agree" (7) ($\alpha = .89$).

Performance ratings. The manager rated the subordinate's performance on six items. Two of the performance rating items were from Tsui (1984). These items were "Overall, to what extent has this employee been performing his/her job the way you would like it to be performed?" and "If you entirely had your way, to what extent would you change the manner in which this employee is performing his/her job" (reverse-scored). Two items regarding perceived competence were modified from Heilman, Block, and

Lucas (1992); these items were "All in all, this employee is very competent" and "In my estimation, this employee gets his or her work done very effectively." We developed the two remaining items: "Overall, to what extent has this employee been effectively fulfilling his/her roles and responsibilities?" and "Rate this employee's overall level of performance." All items were coded on a five-point scale ($\alpha = .92$).

Organizational citizenship behavior (OCB). The altruism dimension of a measure developed by Smith, Organ, and Near (1983) was slightly modified and used to assess OCB. The items included: "This employee helps others with their work when they have been absent even when he/she is not required to do so," "This employee volunteers to do things not formally required by the job," "This employee takes the initiative to orient new employees to the department even though it is not part of his/her job description," "This employee helps others when their work load increases (assist others until they get over the hurdles) even when he/she is not required to do so," "This employee assists me with my duties," "This employee makes innovative suggestions to improve the overall quality of the department," and "This employee willingly attends functions not required by [name of company] management, but which help its overall image." Managers indicated the frequency with which their employees had engaged in these seven citizenship behaviors. They responded to the items on seven-point scales with anchors ranging from "never" (1) to "always" (7). One item was deleted in light of the results of the principal components analysis; the remaining six items were summed to create the variable ($\alpha = .86$).

Favor doing. Three items developed by Kumar and Beyerlein (1991) were used to measure favor doing. The items included "I volunteer to help my manager in matters like locating a home, finding a good insurance agent, etc.," "I spend time listening to my manager's personal problems even if I have no interest in them," and "I offer to help my manager by using my personal contacts." Employees indicated the frequency in which they engaged in these behaviors on seven-point scales with anchors ranging from "never" (1) to "always" (7) ($\alpha = .76$).

RESULTS

Before testing the hypothesized model, we conducted a series of principal components analyses. The items comprising the variables of developmental experiences, POS, LMX, affective commitment, intentions to quit, and favor doing were submitted to a principal components analysis with oblique rotation. One of the affective commitment items loaded on the POS factor, and a second affective commitment item did not load above .40 on any factor. We deleted these two items and submitted the remaining items to principal components analysis. Six factors emerged with eigenvalues greater than 1.0, explaining a total of 66.7 percent of the variance. As shown in Table

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TABLE 1

Results of Principal Components Analysis of Developmental Experiences, POS, LMX, Affective Commitment, Intentions to Quit, and Favor Doing

</div>

	Factors					
Items	**1**	**2**	**3**	**4**	**5**	**6**
POS (factor 1)						
[Name of company] management shows very little concern for me.[a]	.85	−.04	.04	.01	.10	.04
[Name of company] management cares about my general satisfaction at work.	.85	.09	−.01	.00	.01	.02
[Name of company] management really cares about my well-being.	.73	.05	−.04	.08	−.06	.19
[Name of company] management strongly considers my goals and values.	.70	.08	.09	.02	−.10	.06
[Name of company] management cares about my opinions	.67	.01	.15	.00	−.18	.01
Even if I did the best job possible, [name of company] management would fail to notice.[a]	.67	−.01	.11	−.01	−.21	−.14
[Name of company] management takes pride in my accomplishments at work.	.56	.02	.15	.03	−.18	.09
[Name of company] management is willing to extend itself in order to help me perform my job to the best of my ability.	.49	.19	.00	−.03	−.17	.18
Help is available from [name of company] management when I have a problem.	.47	.32	−.01	−.08	−.06	.08
LMX (factor 2)						
I usually know where I stand with my manager.	−.09	.86	.01	−.08	−.03	−.01
My manager has enough confidence in me that he/she would defend and justify my decisions if I was not present to do so.	−.04	.80	.09	−.06	−.11	.00
My working relationship with my manager is effective.	−.07	.79	.06	.01	−.06	−.02
My manager understands my problems and needs.	.19	.76	−.06	.09	.11	−.08
I can count on my manager to "bail me out," even at his or her own expense, when I really need it.	.03	.76	−.05	.02	.05	.01
My manager recognizes my potential.	.07	.72	.08	.02	−.01	.05
Regardless of how much power my manager has built into his or her position, my manager would be personally inclined to use his/her power to help me solve problems in my work.	−.01	.70	.00	.11	−.03	.06
Developmental experiences (factor 3)						
Regardless of [name of company]'s policy on training and development, to what extent have your managers made a substantial investment in you by providing formal training and development opportunities?	.10	.03	.92	.02	.00	.03

TABLE 1 (continued)

Items	Factors					
	1	2	3	4	5	6
In the positions that I have held at [name of company], I have often been assigned projects that have enabled me to develop and strengthen new skills.	−.08	.01	.84	.03	−.06	−.03
In the positions that I have held at [name of company], I have often been given additional challenging assignments.	−.02	−.05	.83	.02	.06	.04
Besides formal training and development opportunities, to what extent have your managers helped to develop your skills by providing you with challenging job assignments?	.21	.11	.73	−.04	.07	.03
Favor doing (factor 4)						
I volunteer to help my manager in matters like locating a home, finding a good insurance agent, etc.	−.03	.07	.00	.86	−.03	−.12
I spend time listening to my manager's personal problems even if I have no interest in them.	.06	.02	.01	.79	.00	−.06
I offer to help my manager by using my personal contacts.	−.07	−.02	.03	.79	.09	.19
Intentions to quit (factor 5)						
As soon as I can find a better job, I'll leave [name of company].	−.05	.00	.00	.00	.84	−.02
I am actively looking for a job outside [name of company].	−.07	−.02	.03	.01	.82	.04
I am seriously thinking of quitting my job.	−.06	−.10	−.05	.03	.80	−.04
I often think of quitting my job at [name of company].	−.20	.06	−.01	−.02	.72	−.01
I think I will still be working at [name of company] five years from now.[a]	.08	−.10	.00	.02	.70	−.08
Affective commitment (factor 6)						
I am willing to put in a great deal of effort beyond that normally expected in order to help [name of company] be successful.	.04	.03	.08	−.04	.18	.74
I really care about the fate of [name of company].	−.14	.07	.08	−.01	−.20	.66
I am extremely glad that I chose [name of company] for which to work, over others I was considering at the time I joined.	.01	.05	.14	.07	−.20	.60
I talk up [name of company] to my friends as a great organization for which to work.	.15	−.13	.04	.30	−.16	.59
I am proud to tell others that I am part of [name of company].	.17	−.01	−.11	.13	−.31	.54
I find that my values and the organization's values are very similar.	.37	.11	−.15	−.01	.04	.54
For me this is the best of all possible organizations for which to work.	.31	−.01	.02	−.04	−.19	.50
Eigenvalue	12.56	3.05	2.59	2.18	1.67	1.29
Percentage of variance explained	35.9	8.7	7.4	6.2	4.8	3.7

[a] Item was reverse-coded.

1, all items loaded above .40 on the appropriate factor, and there were no cross-loadings.

Managers responded to items assessing liking, performance ratings, and OCB. These items were submitted to a principal components analysis with oblique rotation. Three factors emerged with eigenvalues greater than 1.0. One of the OCB items loaded with the performance ratings items. We eliminated this item and submitted the remaining items to a principal components analysis. Three factors emerged, explaining 68.4 percent of the variance. As shown in Table 2, all of the items loaded above .40 on the appro-

TABLE 2
Results of Principal Components Analysis of Liking, Performance Ratings, and OCB

Items	Factors		
	1	2	3
Performance ratings (factor 1)			
Overall, to what extent has this employee been effectively fulfilling his/her roles and responsibilities?	.91	.00	−.04
Overall, to what extent has this employee been performing his/her job the way you would like it to be performed?	.88	.03	−.01
In my estimation, this employee gets his or her work done very effectively.	.87	−.03	.01
Rate this employee's overall level of performance.	.83	.01	.02
If you entirely had your way, to what extent would you change the manner in which this employee is performing his/her job?[a]	.82	.07	−.07
All in all, this employee is very competent.	.72	−.06	.21
OCB (factor 2)			
This employee takes the initiative to orient new employees to the department even though it is *not* part of his/her job description.	−.05	.82	.08
This employee helps others when their work load increases (assist others until they get over the hurdles) even when he/she is *not* required to do so.	−.02	.80	.10
This employee helps others with their work when they have been absent even when he/she is *not* required to do so.	−.03	.74	.16
This employee willingly attends functions *not* required by [name of company] management, but which help its overall image.	−.01	.73	−.13
This employee volunteers to do things *not* formally required by the job.	.15	.71	.07
This employee assists me with my duties.	.08	.66	−.07
Liking (factor 3)			
I think this employee would make a good friend.	−.02	.07	.84
I get along well with this employee.	.05	−.05	.83
I like this employee very much.	.11	.09	.78
Eigenvalue	7.33	1.78	1.17
Percentage of variance explained	48.8	11.8	7.8

[a] Item was reverse-coded.

TABLE 3
Means, Standard Deviations, and Correlations of All Variables[a]

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Developmental experiences[b]	4.79	0.97														
2. Promotions	1.38	1.67	.20**													
3. Organizational tenure	17.52	8.58	.03	-.38**												
4. Liking[b]	5.39	0.95	.26**	.12	-.02											
5. Expectations 1	2.09	2.20	.19**	.48**	-.53**	.23**										
6. Expectations 2	1.12	1.23	.15*	.42**	-.45**	.18**	.86**									
7. Dyad tenure	3.09	2.74	.02	-.09	.13*	.11	-.12	-.13*								
8. POS[b]	4.35	1.18	.45**	.21**	.12	.39**	.16*	.14*	.14*							
9. LMX[b]	4.76	1.08	.31**	.09	.00	.40**	.22**	.25**	.13*	.50**						
10. Affective commitment[b]	5.00	0.97	.36**	.14*	.14*	.27**	.07	.04	.09	.70**	.36**					
11. Intentions to quit[b]	2.81	1.47	-.28**	-.07	-.21**	-.30**	-.08	-.07	-.09	-.63**	-.40**	-.60**				
12. Performance ratings[c]	3.85	0.67	.25**	.11	-.09	.60**	.32**	.30**	.15*	.36**	.45**	.25**	-.29**			
13. OCB[b]	4.75	0.97	.22**	.13*	-.12	.46**	.22**	.21**	.15*	.28**	.26**	.25**	-.20**	.56**		
14. Favor doing[b]	3.76	1.38	.16*	.06	.02	.22**	.06	.05	.12	.12	.14*	.24**	-.04	.04	.25**	

[a] $N = 252$ for all variables.
[b] Measured on a seven-point scale.
[c] Measured on a five-point scale.
* $p < .05$
** $p < .01$

priate factors, and there were no cross-loadings.

Table 3 reports means, standard deviations, and correlations among the variables. The hypothesized model was tested with structural equation modeling. Before testing the model, we used confirmatory factor analysis to examine the distinctiveness of POS and LMX. We accomplished this by comparing the results of a one-factor model, with POS and LMX items loading on one factor, to the results obtained with a two-factor model, in which the POS and LMX items loaded on separate factors. For the one-factor model, the value of chi-square was 866.52 ($p < .01$) with 104 degrees of freedom, and the comparative fit index (CFI) was .705. For the two-factor model, chi-square was 289.70 ($p < .01$), with 103 degrees of freedom, and the comparative fit index was .928. The significant difference in chi-squares and the CFI difference provide support for the two-factor model, suggesting that the POS and LMX items are measuring two separate constructs.

We conducted a second set of confirmatory factor analyses with the performance ratings and OCB items. As with the POS and LMX analyses, we compared a one-factor model with the performance ratings and OCB items loading on one factor to a two-factor model in which the performance rating items load on a separate factor from the OCB items. For the one-factor model the chi-square was 445.79 ($p < .01$), with 54 degrees of freedom, and the CFI was .788. For the two-factor model, the chi-square was 104.89 ($p < .01$), with 53 degrees of freedom, and the CFI was .972. The significant difference in chi-squares and the CFI difference suggest that the performance ratings and OCB items are assessing separate constructs.

To test the hypothesized model, shown in Figure 1, we used two indicators for expectations and single indicators for all other variables because the number of items was large relative to the sample size. This approach enhances the subject-to-degrees-of-freedom ratio. Scale values were used as the indicators for developmental experiences, liking, POS, LMX, affective commitment, intentions to quit, performance ratings, OCB, and favor doing. For these variables, we adjusted for measurement error in the scale values by setting the path from the latent variable to the indicator equal to the square root of the scale reliability. The error variance was set equal to the variance of the scale value multiplied by one minus the reliability (Hayduk, 1987; Jöreskog & Sörbom, 1989; Williams & Hazer, 1986). Because promotions, organizational tenure, and dyad tenure were measured with single items, we had to estimate the measurement error for these variables. We assumed that these variables were measured without error because they are not perceptual and were obtained from company records. For these variables, the path from the latent variable to the indicator was set at one and the error variance was set at zero.

A covariance matrix was used as input to LISREL 8.03 (Jöreskog & Sörbom, 1993). The exogenous variables were assumed to be correlated. Because we predicted a reciprocal relationship between POS and LMX, we allowed the disturbance terms to covary (e.g., Frone, Russell, & Cooper, 1992). Figure 2 shows the maximum likelihood estimates for the rela-

FIGURE 2
Structural Path Estimates of the Hypothesized Model[a]
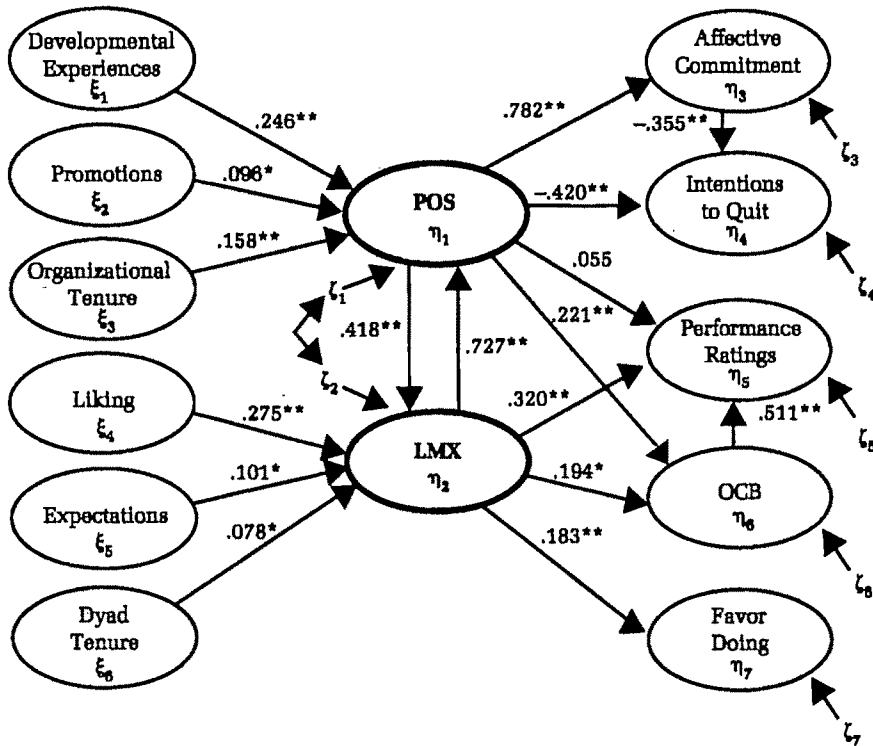
[a]Structural path estimates are the standardized parameter estimates. To simplify the presentation, the measurement model has been omitted, and the correlations among the exogenous variables are not shown.

 *p < .05, one-tailed test
**p < .01, one-tailed test

tionships in the model. Providing support for Hypothesis 1, developmental experiences and number of promotions were positively related to POS. Hypothesis 2 received support in terms of liking and expectations being positively related to LMX. Hypothesis 3 predicts a positive, reciprocal relationship between LMX and POS. The parameter estimates were significant for both paths, indicating support for Hypothesis 3. The antecedents of POS (developmental experiences, promotions, organizational tenure, and LMX) explained 37 percent of the variance in POS. For LMX, 40 percent of the variance was explained by its antecedents (liking, expectations, dyad tenure, and POS). Hypothesis 4 suggests that POS will be positively related to performance ratings and OCB. POS was significantly related to OCB but not to performance ratings. In contrast, LMX

was significantly related to performance ratings and OCB, providing support for Hypothesis 5. Hypothesis 6 was supported; POS was positively related to affective commitment and negatively related to intentions to quit. Providing support for Hypothesis 7, LMX was positively related to favor doing.

Consistent with prior research, the parameter estimate for the relationship between affective commitment and intentions to quit was significant and negative, and OCB was positively related to performance ratings. In terms of the control variables, organizational tenure was significantly related to POS, and dyad tenure was significantly related to LMX. The fit indexes for the overall (hypothesized) model were a chi-square of 173.26 with 56 degrees of freedom ($p < .01$), a goodness-of-fit index of .918, a normed fit index of .878, and a comparative fit index of .912. These results suggest that the data fit the proposed model moderately well (Medsker, Williams, & Holahan, 1994).

Following the approach advocated by Anderson and Gerbing (1988), we compared the hypothesized model to a series of nested models through sequential chi-square difference tests; the results are shown in Table 4. First, we compared the hypothesized model to the structural null model. In the structural null model, the paths relating the constructs to one another were set at zero, but factor loadings were included and the exogenous variables were correlated. The difference in chi-squares was significant, suggesting that the hypothesized model provided a significant improvement in fit. Next, we compared the hypothesized model to nested models, following Anderson and Gerbing, who recommended comparing the hypothesized model to the "next most likely constrained and unconstrained alternatives" to the hypothesized model (1988: 418). A constrained model is one in which one or

TABLE 4
Results of Model Comparisons

Models	χ^2	df	Goodness-of-Fit Index	Normed Fit Index	Comparative Fit Index
Structural null	793.82**	73	.644	.440	.457
Hypothesized	173.26**	56	.918	.878	.912
Model 1[a]	181.39**	58	.915	.872	.907
Model 2[b]	202.48**	58	.907	.857	.891
Model 3[c]	169.41**	53	.921	.880	.912
Model 4[d]	169.94**	54	.919	.880	.913

[a] In comparison to the hypothesized model, model 1 constrains the paths from POS to performance ratings and from POS to OCB to zero.

[b] Model 2 constrains the paths from LMX to performance ratings and from LMX to OCB to zero.

[c] Model 3 adds paths from LMX to affective commitment, from LMX to intentions to quit, and from POS to favor doing.

[d] Model 4 adds paths from developmental experiences to LMX and from promotions to LMX.

** $p < .01$

more of the paths in the hypothesized model are removed or set equal to zero. The change in chi-square between the hypothesized model and the constrained model reflects the effect of removing those paths and thus is a test of their significance to the model. If the change in chi-square is significant, it suggests that the removed paths are important and thus provides support for the hypothesized model. In contrast, an unconstrained model is one in which one or more of the parameters constrained (i.e., set to zero) in the hypothesized model are estimated. In other words, paths are added to the hypothesized model. If the difference in the chi-squares of the unconstrained and hypothesized models is not significant, the hypothesized model is a better fit because it is more parsimonious (Anderson & Gerbing, 1988).

We compared the hypothesized model to two constrained and two unconstrained nested models. Although we hypothesized that both POS and LMX would be related to performance ratings and OCB, we expected that we might find that only one of these exchange relationships directly affected these behaviors. In particular, research on LMX suggests that the exchange between an employee and his or her direct superior is the primary determinant of employee behavior. Thus, we compared the hypothesized model to two constrained models. In model 1, representing the LMX perspective, the path from POS to performance ratings and the path from POS to OCB were both constrained to zero. The difference in chi-squares, 8.13 with 2 degrees of freedom, was significant. The path from LMX to performance ratings and the path from LMX to OCB were set to zero in model 2. This model suggested that POS is the primary determinant of employee behavior. The difference in chi-squares, 29.22 with 2 degrees of freedom, was again significant. These results suggest that the hypothesized model is superior to models 1 and 2, providing support for the importance of both types of exchange (POS and LMX) as predictors of performance ratings and OCB. The hypothesized model was also compared to an unconstrained model, model 3, in which the following paths were added: LMX to affective commitment, LMX to intentions to quit, and POS to favor doing. This model challenges our prediction, captured in the hypothesized model, that POS and LMX are differentially related to some employee attitudes and behaviors. It also challenges our contention that POS is a better predictor than LMX of affective commitment and intentions to quit. The difference between the chi-squares for model 3 and the hypothesized model was 3.85, with 3 degrees of freedom, which was not significant. This finding suggests that adding the three paths (LMX to affective commitment, LMX to intentions to quit, and POS to favor doing) to the hypothesized model does not significantly improve it. These results indicate the hypothesized model's superiority to model 3. We examined a final model, model 4, to determine whether the antecedents of POS and LMX are distinct. Among the antecedents in the model, two of the antecedents of POS, developmental experiences and promotions, might influence LMX. That is, employees who have had numerous developmental experiences may have desirable skills that make them more likely to develop high-quality exchanges with their superiors. Further, lead-

ers may be more likely to develop high-quality exchanges with employees who have been successful in the past, as indicated by the number of promotions. Thus, in comparison to the hypothesized model, model 4 included a path from developmental experiences to LMX and from promotions to LMX. The difference in the chi-squares of model 4 and the hypothesized model, 3.32 with 2 degrees of freedom, was not significant. Overall, the results of the model comparisons provide support for the hypothesized model.

DISCUSSION

Even though both POS and LMX are based on social exchange frameworks, research investigating these two constructs has developed independently. This study brought POS and LMX together in an integrated model of social exchange. Our study provided evidence of the distinctiveness of POS and LMX and suggested that both types of exchanges are important and influence different outcomes. First, the confirmatory factor analysis supported the existence of two factors representing the POS and LMX constructs. Second, we found a distinct pattern of antecedents and outcomes for POS and LMX, providing additional support for the existence of these two types of social exchange. This pattern of results implies that employees distinguish between exchanges with leaders and with organizations.

Although support was found for the distinctiveness of POS and LMX, they are related and influence one another. However, the quality of leader-member exchange appears to have a stronger effect on perceived organizational support, indicating that LMX plays a key role in affecting employees' perceptions of organizational support. Consistent with Eisenberger and colleagues' (1986) conceptualization, because the leader is often the source or distributor of discretionary rewards provided by an organization, the exchange between the leader and subordinate may influence POS. Immediate superiors may act as conduits of organizational resources, especially in hierarchically structured organizations like the one studied in the current investigation. Superiors are often instrumental in determining salary increases and bonuses as well as in providing career advice, task and training opportunities, emotional support, and information. In addition, in high-quality leader-member exchanges, superiors may introduce subordinates to key individuals in other parts of their organizations (Sparrowe & Liden, 1997.) These introductions may result in the expansion of the subordinates' social networks, which may in turn lead to additional dividends such as greater visibility, information, and other forms of support (Burt, 1992). In sum, the nature of the LMX relationship may directly and indirectly influence subordinate perceptions of organizational support.

POS also may affect the quality of the exchange that develops between an employee and his or her leader. It is consistent with the idea of self-fulfilling prophecy that leaders may develop higher expectations and higher-quality exchanges with employees the organization has supported in the

past. Moreover, it is likely that employees who have received high levels of organizational support have enhanced skills and abilities that would benefit their leaders. In essence, these employees may be attractive exchange partners because they possess resources that are valued by leaders.

Of the potential antecedents of POS, developmental experiences were positively related to POS. Employees who had participated in more formal and informal training and development experiences than others reported higher levels of perceived organizational support. Similarly, employees who had received more promotions during the past five years reported higher levels of POS. Although causality cannot be determined, these results indicate that an employee's history of treatment by the organization in the area of promotion and developmental experiences may influence POS. Thus, when organizations invest in and provide recognition for employees, they may also be encouraging the development of strong social exchange relationships.

Two potential antecedents of LMX were explored in this study: leader's perceptions of liking, and expectations. Consistent with prior research (e.g., Liden et al., 1993; Wayne & Ferris, 1990), affect was related to LMX. Thus, affect may be an important component of social exchanges between leaders and subordinates. Affect may increase the unspecified obligations in leader-member exchanges in such a way that both parties are diligent in maintaining the exchanges. Leaders' expectations of their subordinates were also related to LMX. Leaders who expected that their subordinates would reach high levels in their organizations were more likely to develop high-quality leader-member exchanges.

POS and LMX were related to a number of important employee attitudes and behaviors. As expected, LMX was positively related to performance, OCB, and favor doing, outcomes that directly benefit leaders. These results support a social exchange perspective whereby an employee may help a leader by performing required job activities well, and also by going beyond the job requirements in exchange for benefits provided by the leader through LMX. Outcomes associated with POS were more clearly linked with fulfilling obligations to the organization, including affective commitment, intentions to quit, and citizenship behavior. However, unlike LMX, POS did not contribute directly to job performance. Although the simple correlation between POS and performance ratings was significant ($r = .36$), POS was dominated by LMX when tested with structural equation modeling, a multivariate technique. Perhaps members primarily view job performance as an obligation to their leaders as opposed to their organizations. Thus, when members have strong exchange relationships with their leaders, they are more likely to fulfill their role requirements (have high levels of performance).

This study contributes to the literature in a number of ways. First, the pattern of antecedents and outcomes provided strong support for Eisenberger and colleagues' (1986) conceptualization of POS as based on a social exchange in which discretionary treatment by an organization leads to POS. POS, in turn, leads to employee fulfillment of obligations through attitudes

and behaviors that aid the organization. In light of the few studies that have been published on POS, this finding provides a valuable contribution to the literature. Particularly important was the link established between POS and LMX, since the latter construct has a well-developed conceptual (Dienesch & Liden, 1986; Graen, 1976; Graen & Cashman, 1975) and empirical basis (e.g., Liden et al., 1997). Second, even though both LMX and POS are based on a social exchange framework, this study provided evidence that they are distinct. In addition, each of these constructs was linked with important outcomes, suggesting that members' exchanges with both leaders and organizations are salient for organizations. Future research should explore other types of social exchange relationships, such as those with co-workers and customers, in light of the promising results found in the present study.

The results of this study have a number of implications for future research. First, they suggest that researchers need to incorporate both types of exchanges (leader and organization) into predictive models of employee attitudes and behaviors. A second implication is that an employee's history of treatment in the areas of promotion and developmental experiences appears to be more consistently linked with POS than with LMX. In contrast, LMX was predicted by aspects of employees' relationships with leaders (liking, expectations). Future research should examine additional predictors of POS. It may be that other discretionary benefits, those typically not provided to all employees, such as participation in high-potential, fast-track programs, are related to POS. Finally, it would be interesting to examine the degree to which POS varies as a function of changes in LMX, especially when an employee changes from one superior to another.

A number of strengths and limitations of this research should be recognized. In terms of limitations, this study was cross-sectional and examined established exchange relationships. Because of the cross-sectional design, we are unable to determine causality among the variables, but can only make inferences. Additionally, the design prevented us from examining actual turnover. Another limitation is related to the sample used in this study. Our sample included 252 employees who had been with the organization five years or more. Because of the complexity of the hypothesized model, it is important that it be tested with a larger and more diverse sample. Future research is needed to examine how LMX and POS develop over time with new employees. A primary strength of this study was the use of three sources for the data: employees, managers, and company records. The use of multiple sources decreases the likelihood of common method explanations for the relationships. However, some of the variables in the relationships were measured with data from the same source, such as the relationship between POS and affective commitment. Therefore, the fact that the relationship between POS and affective commitment was stronger than the relationship between POS and OCB may have been due to the fact that POS and affective commitment were measured from the same source.

In summary, the results of this study suggest that there may be unique antecedents of POS and LMX. Possible antecedents important to POS in-

cluded treatment of employees by the organization during their history of employment. In contrast, variables that may serve as antecedents to high-quality leader-member exchanges included characteristics of the interpersonal relationship and future expectations of the employee. With respect to likely consequences, POS and LMX have similar effects on some employee attitudes and behaviors but not on others. In exchange for organizational support, employees become affectively committed to their organizations and less likely to leave, but in exchange for high-quality relationships with their superiors, they perform well. However, both LMX and POS were related to citizenship, suggesting that employees engage in such behavior to fulfill obligations to both their leaders and their employers. Consistent with social exchange theory, both POS and LMX may result in employees reciprocating received benefits with organizationally desirable attitudes and behaviors.

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EFFECT OF RACE ON PROMOTIONS TO TOP MANAGEMENT IN A FEDERAL DEPARTMENT

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Applicant race did not directly affect promotion decisions for top management positions in a cabinet-level U.S. government department with standardized promotion practices that include a panel review process. However, race indirectly affected promotion decisions through key job-relevant variables, to the disadvantage of applicants of color.

Despite the growing proportion of racial minorities in the workplace (Johnson & Packer, 1987) and the concurrent emphasis on valuing diversity in organizations (Jackson & Associates. 1992), the proportion of people of color in top management positions in U.S. organizations remains less than 1 percent (Korn/Ferry International, 1990). Evidence suggests that people of color encounter a "glass ceiling" that keeps them from reaching the tops of managerial hierarchies (Morrison & Von Glinow, 1990). The purpose of the present study was to explore decision processes that may explain the existence of the glass ceiling for racial minorities. Specifically, the study examined the direct and indirect effects of applicant race, as well as the effect of the interaction between applicant race and gender, on actual promotion decisions for top management positions in a U.S. federal government department.[1]

Although a substantial body of literature has examined the advancement of women as managers (e.g., Blum, Fields, & Goodman, 1994; Powell, 1993; Powell & Butterfield, 1994; Tharenou, Latimer, & Conroy, 1994), less

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[1] Although the terms "race" and "ethnicity" differ in definition, scholars have often used them interchangeably (Betancourt & López, 1993]. We use the term race as Jones defined it, to refer to "a group of people who share biological features that come to signify group membership and the social meaning such membership has for the society at large" (1991: 9). Jones argued that the primary significance of race is social. In this study, we were concerned with the social aspect of race as an applicant characteristic that might directly or indirectly influence promotion decisions.

attention has been given to the advancement of members of racial minorities in management. In fact, research on the effect of race on any work-related variable has been rare (Cox & Nkomo, 1990). Further, in reviewing the limited research on factors affecting the involvement of racial minorities in organizations, Ilgen and Youtz (1986) concluded that far more attention has been given to minority group members' access to jobs than to their treatment as job incumbents. Promotions, one aspect of the treatment of incumbents, can be awarded to certain groups but not to others, or awarded to certain groups at a faster rate than to others. No empirical research has examined the effect of race on decisions about promotion to top management positions.

In most organizations, individuals under little monitoring or surveillance make promotion decisions. However, behavior changes when it is watched. The processes of self-monitoring and impression management (Schlenker & Weigold, 1992; Snyder, 1979) lead to public behavior that is influenced by social norms and expectations. In particular, when promotion decisions are made by a panel of individuals and decision makers are held accountable for their decisions, behavior may be different from what it is when decisions are made by a sole individual and are not subject to scrutiny. Overt kinds of discrimination may be least likely to occur in the context of scrutinized group decisions. Stumpf and London (1981) suggested that biased decision making may be reduced by standardized promotion practices, including formal statements of how decisions are to be made and what factors are to be considered when evaluating applicants. One organization that makes promotions to top management by a standardized procedure that includes a panel review and keeps detailed records of the process, thereby enabling identification of decisions that are not properly made, is the United States federal government. The federal government also has a long-standing commitment to diversity and equal employment opportunity. Thus, it provided an opportunity to examine the outcomes associated with a decision process that is structured to ensure equitable treatment.

HYPOTHESES AND RESEARCH QUESTION

Two types of explanations have been offered for why there are few people of color in top management positions. One is that applicant race has a *direct* effect on promotion decisions, to the disadvantage of racial minorities. The other is that applicant race has an *indirect* effect on promotion decisions through its influence on job-relevant variables, also to the disadvantage of racial minorities. These are not competing explanations; applicant race may affect promotion decisions both directly and indirectly. Applicant race may also interact with applicant gender to influence promotion decisions.

Direct Effect of Applicant Race

Most of the literature on racism in society has examined antiblack sentiments among white Americans. Whereas whites are less likely to express

openly racist sentiments now than in the past, most scholars agree that prejudice against blacks continues in more subtle forms. For example, Gaertner and Dovidio (1986) proposed that whites' current attitudes toward blacks reflect aversive racism, defined as a state of ambivalence caused by a conflict between egalitarian values and unacknowledged negative affect toward blacks. Aversive racists' negative affect toward blacks stems from discomfort, uneasiness, and fear rather than from hostility or hate. Similarly, Sears (1988) proposed that symbolic racism, defined as a blend of negative affect toward blacks and traditional American values such as individualism and self-reliance, has largely replaced old-fashioned racism, or open bigotry, among whites. But like old-fashioned racists, aversive and symbolic racists are inclined to discriminate on the basis of race.

Direct effects of race may also arise in the workplace from the way people process information when making personnel decisions (Motowidlo, 1986). Ilgen and Youtz (1986) suggested that systematic biases occur in raters' evaluations, so that racial minorities are evaluated more on the basis of stereotypes characterizing them as inferior performers than on the basis of their actual performance. Research on the direct effect of ratee race (black or white) on performance evaluations has yielded contradictory results. Work by Greenhaus, Parasuraman, and Wormley (1990) and a meta-analysis by Kraiger and Ford (1985) both revealed that black employees received lower performance evaluations than white employees. However, both of these studies failed to isolate the effects of racial bias from the effects of true performance differences. In a study of a military sample in which effects were so isolated, Pulakos, White, Oppler, and Borman (1989) found that the direct effect of ratee race on performance evaluations was minimal. Using large civilian samples, Sackett and DuBois (1991) and Waldman and Avolio (1991) obtained results similar to those of Pulakos and colleagues (1989).

In summary, theory (primarily based on whites' attitudes toward blacks) suggests the presence of a direct effect of applicant race that works to the disadvantage of racial minorities. However, research evidence (primarily based on black-white comparisons) on the direct effect of race in the workplace is inconsistent. Further, because of self-monitoring and impression management processes (Schlenker & Weigold, 1992; Snyder, 1979), individuals may be less likely to discriminate on the basis of race when their decisions are subject to scrutiny, such as review by a panel. Thus,

> *Hypothesis 1: Applicant race does not directly influence promotion decisions for top management positions.*

Indirect Effect of Applicant Race

Applicant race may indirectly affect promotion decisions for top management positions through its relationship with key job-relevant variables such as education, work experience, highest managerial level attained, years at the highest level, results of the most recent performance evaluation, and current membership in the promoting organization. For example, differences

in the educational attainment of members of different races, or a race-based difference in proximity to decision makers, may adversely affect the promotion opportunities of minorities. Further, there may be differences in the earlier treatment of majority and minority group applicants that affect their later treatment, including promotion decisions made about them (Ilgen & Youtz, 1986). Racial minorities may have less access to informal networks and mentoring opportunities, or the mostly cross-race mentoring opportunities that are available to them may offer less support than same-race mentoring opportunities would provide (Thomas & Alderfer, 1989). They are more likely to be tokens in their work settings (Kanter, 1977) and to thereby experience unfavorable treatment that hinders their development. Further, they are more likely to be tracked into jobs and departments that are not rungs on upward career ladders (Braddock & McPartland, 1987). As a result, members of racial minorities may be developed less as individuals than majority group members (Ilgen & Youtz, 1986). Deficits in individual development may in turn make racial minorities appear unsuited for advancement to the highest levels and lead them to languish at lower levels of organizations, making it appear that they have plateaued (Veiga, 1981). Developmental deficits may also lead to their receiving lower evaluations that restrict their future opportunities for advancement (Greenhaus et al., 1990).

In summary, the direct effect of race on job-relevant variables, as well as its indirect effect through its influence on applicants' prior treatment and development, may contribute to less favorable promotion decisions for racial minorities regarding top management positions, even if there is no direct effect of race when these decisions are made. Thus,

> *Hypothesis 2: Applicant race indirectly influences promotion decisions for top management positions, via applicants of color rating less favorably than white applicants on job-relevant variables that influence decision outcomes.*

Effect of Interaction between Applicant Race and Gender

Although racism and sexism may be regarded as parallel processes because in both, a personal characteristic is the basis for discriminatory behavior, there are important differences between them (Reid, 1988). Thus, the interaction between race and gender warrants attention, particularly as it affects the experiences of women of color. Two competing views of this interaction have emerged in the relevant literature (Bell, Denton, & Nkomo, 1993). One view is that women of color are victims of a "double whammy" and thus occupy a more marginal position in organizations than other groups. The other view is that women of color are beneficiaries of a double advantage, enjoying a privileged status in organizations because they can be counted as "double minorities" in terms of affirmative action mandates. However, in their review of research on the interaction between race and gender in management, Bell and colleagues (1993) concluded that neither

the double whammy nor the double advantage view has fully explained the complex experiences of female managers of color. Thus, we explored the research question, Do applicant race and gender interact to influence promotion decisions for top management positions and, if so, how?

METHODS

Procedures and Population

The Senior Executive Service (SES) consists of all top management positions in the United States government that can be attained without political sponsorship (approximately 1 percent of all positions). When an SES position becomes open, an announcement is circulated that specifies the criteria by which applicants will be judged. Six of these criteria are the same for all positions, and the others are position-specific. Interested individuals submit formal applications that provide background and career history data. The personnel office in which the vacancy is located screens out applicants who do not meet minimum eligibility criteria. The selecting official—the person who will make the final decision—asks a panel of senior department employees to review the credentials of the remaining applicants. The review panel evaluates each applicant on each of the specified criteria and decides which applicants to refer to the selecting official for final consideration. The selecting official then selects the applicant who will receive the job. Hiring departments retain information on the entire process in promotion files for at least two years. These files contain information on applicant gender (solicited on the application form as "for statistical use"), but they do not contain information on applicant race as a matter of federal law.

In previous research (Powell & Butterfield, 1994), we obtained data from promotion files for decisions about open SES positions made by a cabinet-level federal department between January 1987 and February 1992 for the purpose of examining gender effects. The present study used these data in addition to newly collected data, which were obtained from files on the department's SES promotion decisions made between March 1992 and December 1994. We restricted the sample to applicants who were already federal employees so that we could obtain data on applicant race. However, as this information was not included in promotion files, it was obtained by a special procedure. For applicants who were employed in the hiring department, data on race were obtained from the department's separate personnel management information system. For those employed in another federal department, data on race were requested from the U.S. Office of Personnel Management (OPM) using applicants' social security numbers.

In 1991, 67 percent of the focal department's Senior Executive Service positions were held by white men, 19 percent by white women, 9 percent by men of color, and 5 percent by women of color. Federal employees who are not in SES positions have grade levels of up to 15; grades 13 to 15 are considered the pipeline to the SES. Sixty-two percent of the department's

pipeline positions were held by white men, 19 percent by white women, 11 percent by men of color, and 8 percent by women of color.

Sample

From January 1987 to December 1994, 39 open SES positions were filled within the focal department. The initial screening yielded 521 applicants who were regarded as at least minimally qualified for the positions they applied for; 465 of these individuals were federal employees. Race data were obtainable for 300 (65%) of the 465 federal applicants. Most of the missing data on race were for applicants employed in departments other than the focal one; some departments had not fully reported data on employee race to the Office of Personnel Management, and some applicants no longer appeared in OPM records because they had left federal service before race data were requested. We conducted analyses on data for the 300 applicants for whom race data were available.

Of these applicants, 15 percent were African American, 4 percent were Asian American, 4 percent were Hispanic American, 1 percent were Native American, and 76 percent were Caucasian. Since the number of applicants from each minority group was small, applicants from all such groups were combined in analyses. Overall, the 300 applicants consisted of 64 percent (191) white men, 12 percent (37) white women, 21 percent (63) men of color, and 3 percent (9) women of color.

The mean full-time work experience was 23 years. The mean age was 48 years. As for the highest degree obtained, 69 percent of the sampled applicants had obtained a graduate degree, 30 percent a bachelor's degree, and 1 percent had a lower degree. Sixty-seven percent were employed by the hiring department. The highest federal employment grade was 13 or lower for 1 percent, 14 for 15 percent, and 15 for 72 percent; 12 percent of the applicants currently had SES positions. The mean time at the highest grade was six years. Of the 300 applicants, 75 percent (226) were referred by the review panel to the selecting official. Of the 226 referred applicants, 17 percent (39) were selected to fill the open positions.

Review panels consisted of one to three members. Sixty-six percent of all applicants were reviewed by all-white panels, 2 percent by a one-member panel, 57 percent by a two-member panel, and 7 percent by a three-member panel; 34 percent were reviewed by mixed-race panels (32 percent by one white member and one member of color and 2 percent by one white member and two members of color). No applicant was reviewed by a panel consisting entirely of people of color. Of the referred applicants, 45 percent were reviewed by a selecting official of color.[2]

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[2] Neither the race composition of the review panel (coded as all-white or mixed-race) nor the race of the selecting official influenced the relationship between applicant race and promotion decision outcomes. Also, outcomes of review panels' decisions were unrelated to panel size. Contact the senior author for information on these analyses.

Measures

Three variables served as measures of outcomes of promotion decisions. The review panel's evaluation of an applicant's qualifications for a position was measured by the average of its ratings of the applicant on a three-point scale for each of the specified criteria for the position. Referral by the review panel and selection for a position were the other two outcome measures.

The job-irrelevant variables of applicant race and gender and six job-relevant variables were included in analyses as potential predictors of the outcome measures. The job-relevant variables were whether the applicant was currently employed in the hiring department, the summary rating on the most recent performance evaluation, the highest grade held in the federal government, years at the highest grade, years of full-time work experience, and the highest degree obtained. (Applicant age was not included as a predictor because it was highly correlated [$r = .85$] with years of full-time work experience.) Table 1 gives the coding of all measures.

Analysis

Two of the outcome measures were used in analyses for all 300 applicants: the review panel evaluation on the criteria for a position and its referral decision. We used ordinary-least-squares regression analysis to determine the influence of predictor variables on panel evaluations for these applicants. Logistic regression analysis was used to assess the influence of the same predictor variables on the dichotomous refer/do-not-refer decision. The third outcome measure, the selecting official's decision about choosing an applicant for a position, was only applicable to the 226 applicants who were referred by the review panel. Logistic regression analysis was also used to assess the influence of predictor variables on the dichotomous select/do-not-select decision for these applicants. Also, for each outcome measure we used hierarchical regression equations to obtain the unique variance explained by the job-irrelevant variables and the job-relevant variables after the other set of variables had been entered into the regression equation. However, the number of women of color in the sample was considered too small to allow inclusion of the interaction between race and gender as a predictor in regression equations; we examined cell means to explore the influence of this interaction on outcomes instead.

RESULTS

Table 1 reports correlations, means, and standard deviations for the eight predictor and three outcome variables for the sample of 300 applicants. The highest correlation among the predictor variables was .26.

Table 2 presents race differences in measures for the sample of 300 applicants and the subsample of 226 referred applicants. Applicants of color were significantly less likely to be referred than white applicants; they were also significantly less likely to be employed in the hiring department, had significantly more work experience, and were significantly lower on the

TABLE 1
Descriptive Statistics and Correlations[a]

Variables[b]	Mean	s.d.	1	2	3	4	5	6	7	8	9	10
Predictors												
1. Race	1.24	0.43										
2. Gender	1.15	0.36	-.04									
3. Employed in hiring department	0.67	0.47	-.20	.12								
4. Performance evaluation	4.28	0.67	-.06	.19	-.18							
5. Highest grade achieved	2.95	0.57	.04	.05	-.21	-.03						
6. Years at highest grade	6.28	4.65	.02	-.04	.18	-.04	-.17					
7. Years of full-time work experience	23.07	7.15	.18	-.10	.00	-.19	.21	.26				
8. Highest degree achieved	2.68	0.50	-.13	-.05	-.06	-.08	.12	-.12	-.14			
Outcomes												
9. Panel evaluation	2.74	0.36	-.03	.16	.30	.12	.09	.12	-.14	-.09		
10. Referral decision	0.75	0.43	-.11	.16	.28	.11	.10	.08	-.09	.00	.45	
11. Selection decision	0.13	0.34	-.03	.17	.17	.14	.05	-.07	-.12	.01	.19	.22

[a] Correlations with an absolute value of .12 or higher are significant at the .05 level.

[b] Variables were coded as follows: race, 1 = white, 2 = of color; gender, 1 = man, 2 = woman; employment in hiring department, 0 = no, 1 = yes; performance evaluation, 1 = less than satisfactory, 2 = satisfactory, 3 = fully successful, 4 = highly effective, 5 = outstanding on the summary rating for the most recent evaluation; highest grade achieved, 1 = grade 13 or less, 2 = grade 14, 3 = grade 15, 4 = Senior Executive Service; highest degree achieved, 1 = less than bachelor's degree, 2 = bachelor's degree, 3 = graduate degree; panel evaluation, 1 = low, 2 = medium, 3 = high, coded for each of the specified criteria included in the calculation of the mean rating; and referral decision and selection decision, 0 = no, 1 = yes.

TABLE 2
Differences in Means by Race[a]

Variables	All Applicants[b]				Referred Applicants[c]			
	White	Of Color	t	df	White	Of Color	t	df
Gender	1.16	1.12	0.76	298	1.19	1.19	-0.03	224
Percentage employed in hiring department	72.37	50.00	3.58***	298	79.21	54.17	3.59***	224
Performance evaluation	4.30	4.20	0.97	247	4.34	4.24	0.83	186
Highest grade achieved	2.94	2.99	-0.62	298	2.97	3.04	-0.87	224
Years at highest grade	6.22	6.49	-0.42	298	6.48	6.62	-0.19	224
Years of full-time work experience	22.35	25.35	-3.14**	297	21.98	25.29	-2.88**	223
Highest degree achieved	2.71	2.56	2.20*	294	2.71	2.55	1.88	220
Panel evaluation	2.75	2.72	0.58	285	2.83	2.88	-1.00	213
Percentage referred	78.07	66.67	1.96*	298				
Percentage selected					17.42	16.67	0.12	224

[a] We performed t-tests for all applicants ($n = 300$) and for referred applicants ($n = 228$). Degrees of freedom, equal to $n - 2$, vary because of missing data.

[b] For the entire sample, $n = 228$ for white applicants, and $n = 72$ for applicants of color.

[c] For the sample of referred applicants, $n = 178$ for white applicants, and $n = 48$ for applicants of color.

   * $p < .05$
  ** $p < .01$
 *** $p < .001$

highest degree obtained. Among referred applicants, there were significant race differences in employment in the hiring department (fewer applicants of color were so employed) and in years of work experience (it was higher for applicants of color).

Panel evaluations for all applicants were regressed on applicant race and gender and the six job-relevant measures using ordinary-least-squares regression (Table 3). In support of Hypothesis 1, race did not have a significant direct effect on panel evaluations; also, the job-irrelevant variables of race and gender did not explain a significant amount of unique variance in panel evaluations as a set. However, the job-relevant variables explained a significant amount of unique variance in panel evaluations as a set (13%). In particular, three of the job-relevant variables—employment in the hiring department, highest grade of federal employment achieved, and years of full-time work experience (a negative effect)—significantly influenced panel evaluations. Applicants of color differed from white applicants on two of the significant job-relevant predictors of panel evaluations: employment in the hiring department and years of work experience (Table 2). In support of Hypothesis 2, the indirect effect of race on panel evaluations through these predictors favored white applicants. Applicants of color were significantly less likely than white applicants to be employed in the hiring department, which was positively related to panel evaluations; they also had significantly more work experience, which was negatively related to panel evaluations.

Table 4 presents the results of a logistic regression analysis for the referral decision for all applicants. The results were very similar to those

TABLE 3
Results of Ordinary-Least-Squares Regression Analysis: Panel Evaluations for All Applicants[a]

Variables	β	Unique R^2
Job-irrelevant variables		.01
Race	.08	
Gender	.09	
Job-relevant variables		.13***
Employed in hiring department	.32***	
Performance evaluation	.12	
Highest grade achieved	.20**	
Years at highest grade	.13	
Years of full-time work experience	−.17*	
Highest degree achieved	−.05	
$F_{8,228}$	5.21***	
R^2	.15	
Adjusted R^2	.12	

[a] Because of missing data, $n = 237$.
    * $p < .05$
   ** $p < .01$
  *** $p < .001$

obtained for panel evaluations. In support of Hypothesis 1, there was no significant direct effect of race on referral decisions; also, the job-irrelevant variables did not explain a significant amount of unique variance in referral decisions as a set. However, the job-relevant variables explained a significant amount of unique variance in referral decisions as a set (15%). Employment in the hiring department, highest grade achieved, and years of full-time work experience (a negative effect) significantly influenced referral decisions as before. In support of Hypothesis 2, the indirect effect of race on referral decisions through two of these variables, employment in the hiring department and years of work experience, favored white applicants.

A logistic regression analysis was also conducted for the selection decision for applicants who were referred by the review panel to the selecting official (Table 5). Since the review panel transmitted evaluations of applicants as well as referral decisions, we included panel evaluations as a predictor. However, the regression model failed to reach significance. None of the individual predictors, and neither the job-irrelevant nor the job-relevant variables as a set of predictors, had a significant effect on selection decisions. Thus, Hypothesis 1 was supported for selection decisions, but Hypothesis 2 was not.

We compared cell means for different race-gender groups to explore the effect of the interaction between race and gender on promotion decision outcomes. Panel evaluation means were 2.70 for men of color versus 2.73 for white men ($t_{239} = .49$, n.s.) and 2.88 for both women of color and white women, suggesting the absence of an interaction effect for panel evaluations.

TABLE 4
Results of Logistic Regression Analysis: Referral Decisions for
All Applicants[a]

Variables	b	s.e.	Unique Pseudo R^2
Job-irrelevant variables			.01
Race	0.30	.41	
Gender	0.94	.60	
Job-relevant variables			.15***
Employed in hiring department	2.08***	.42	
Performance evaluation	0.52	.28	
Highest grade achieved	1.17***	.35	
Years at highest grade	0.07	.04	
Years of full-time work experience	−0.09**	.03	
Highest degree achieved	0.15	.36	
Constant	−6.19**	2.30	
Chi-square	50.21***		
df	8		
Pseudo R^2	.17		

[a] Because of missing data, $n = 237$.
** $p < .01$
*** $p < .001$

TABLE 5
Results of Logistic Regression Analysis: Selection Decisions for Referred Applicants[a]

Variables	b	s.e.	Unique Pseudo R^2
Job-irrelevant variables			.00
Race	−0.02	0.57	
Gender	0.40	0.45	
Job-relevant variables			.05
Employed in hiring department	0.95	0.68	
Performance evaluation	0.60	0.35	
Highest grade achieved	0.41	0.52	
Years at highest grade	−0.08	0.05	
Years of full-time work experience	−0.01	0.03	
Highest degree achieved	−0.05	0.40	
Panel evaluation	1.24	1.36	
Constant	−9.38*	4.59	
Chi-square	13.43		
df	9		
Pseudo R^2	.07		

[a] Because of missing data, $n = 177$.
* $p < .05$

However, 62 percent of the men of color versus 76 percent of the white men ($\chi^2_1 = 4.66$, $p < .05$) and 100 percent of the women of color versus 89 percent of the white women (χ^2_1) = 1.07, n.s.) were referred to the selecting official by the review panel. These comparisons indicated that referral decisions were less favorable for men of color than for white men but did not differ for women of color and white women, suggesting the presence of an interaction effect for referral decisions. The significant race difference in referral decisions for men may have been due to race differences for men in both employment in the hiring department and work experience, which were factors that significantly influenced referral decisions for all applicants. Of men of color, 43 percent were employed in the hiring department, versus 72 percent of white men ($\chi^2_1 = 17.26$, $p < .001$). Also, men of color had 25.21 years of work experience versus 22.77 years for white men ($t_{251} = -2.38$, $p < .05$). Thus, the lower proportion of favorable referral decisions for men of color may have been due to their lower representation in the hiring department and their greater amount of work experience.

Of the referred applicants, 8 percent of men of color versus 17 percent of white men ($\chi^2_1 = 1.93$, n.s.) and 56 percent of women of color versus 21 percent of white women ($\chi^2_1 = 4.09$, $p < .05$) were selected for positions. These comparisons indicated that selection decisions were more favorable for women of color than for white women but did not differ for men of color and white men, suggesting the presence of an interaction effect for selection decisions. The significant race difference in selection decisions for women could not be explained by the indirect effect of race through job-relevant

variables, because none of the job-relevant variables actually predicted se-
lection decisions. However, it must be remembered that the number of
women of color in the sample was extremely small. A change in the outcome
of only one or two of the decisions about them would have altered the results
of these comparisons considerably.

DISCUSSION

Applicant race did not directly affect promotion decisions. However, it
indirectly affected promotion decisions through job-relevant variables to the
disadvantage of applicants of color. In particular, the indirect effects of ap-
plicant race on both panel evaluations and referral decisions through two
job-relevant variables, employment in the hiring department and years of
work experience, favored white applicants.

Overall, the results were consistent with the results of other research
(e.g., Greenhaus et al., 1990) showing that people of color experience less
career progress in organizations than white people. In the present study,
these limits did not appear to be due to decision makers' racist sentiments
(Gaertner & Dovidio, 1986; Sears, 1988) or race-related biases in processing
information (Ilgen & Youtz, 1986; Motowidlo, 1986). Instead, they were at-
tributable to race differences in key job-relevant variables that affected pro-
motion decisions by review panels. First, people of color were less likely to
be employed in the hiring department studied, which in turn negatively
affected review panels' decisions about them. Panel members, all of whom
were insiders, may have seen insiders as more ready to handle the positions
because they were more familiar with the department. Second, people of
color had more cumulative work experience, which also negatively affected
review panels' decisions about them. Applicants who had reached the pipe-
line grades for Senior Executive Service positions with fewer years of work
experience may have been seen as on upward career ladders (Braddock &
McPartland, 1987) and thereby as more likely to succeed in the ranks of top
management; in contrast, applicants with more years of work experience
may have been seen as plateaued (Veiga, 1981) and unlikely to succeed in
top management positions.

However, women of color did not experience the negative effects of race
that were experienced by men of color in this study; all of them were referred
by review panels, and a majority of them were selected for open positions.
The small number of women of color in the sample makes it inappropriate
to reach a conclusion about whether race and gender interacted to influence
promotion decisions to their advantage, which would support the double
advantage theory about this interaction (Bell et al., 1993).[3] Since all of them
were employed in the hiring department, they may have benefited from

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[3] Indeed, the small number of racial minorities, especially women of color, in many organ-
izations makes it difficult to reach firm conclusions about any kind of race-related effect in the
field (Cox, 1990).

review panels' preference for insiders. Further, these women may have over-
come race-related obstacles earlier in their careers to be in the position to be
considered for top management. They may have had to be more highly
motivated than their white female, white male, and minority male counter-
parts just to get to this position.

The unique nature of the organization in which data were collected may
have had an impact on the results. As we noted in earlier research (Powell
& Butterfield, 1994), the federal government is particularly concerned with
issues of procedural fairness in making promotion decisions for SES posi-
tions. It engages in many of the practices suggested as remedies for biased
decision making (Stumpf & London, 1981). These practices may have con-
tributed to the absence of direct effects of race on promotion decisions.
However, it is not certain that promotion decisions were based on variables
that were actually related to effective performance in top management. The
review panels may have preferred insiders because such applicants were
better prepared for the jobs. However, the panels may have preferred such
applicants because they had an advantage in networking and in knowing
how best to present themselves as suitable for the jobs; decision makers may
have preferred applicants whom they knew or whom they saw as more
similar to themselves. In addition, review panels may have preferred appli-
cants with less work experience because they deserved their status of "fast-
trackers." However, because applicants with more work experience tended
to be older, this preference also may have represented age bias. Race differ-
ences in job-relevant variables that influenced promotion decisions but were
unrelated to effective performance would constitute disparate impact dis-
crimination (Ledvinka & Scarpello, 1991) and would not reflect well on the
department's (or the federal government's) decision-making process. How-
ever, since we did not have measures of performance subsequent to promo-
tions, we could not use the present data set to investigate this issue.

It should be noted that despite effects of individual job-relevant vari-
ables on panel evaluations and initial selection decisions (Tables 3 and 4),
there were no such effects for final selection decisions (Table 5). These
decisions were not predicted by race, gender, or the job-relevant variables
examined. We can only speculate about why these data did not explain the
final promotion choices. Perhaps other job-relevant variables that were not
measured would have explained selection decisions better than those that
were measured. In addition, the formality and scrutiny of the panel review
process may bring job-relevant variables more clearly into play than when
selection decisions are made. As candidates are passed over by a review
panel, the surviving finalists become more like each other, making predic-
tions based on similar differences all the more difficult. In the end, final
promotion decisions may be based on factors that are not measurable in any
study, such as the present one, that relies on archival data. They may be
based on subjective preferences of decision makers that are not race- or
gender-related but have some other origin, or on individual differences be-
tween applicants referred by review panels that are not easily captured by

empirical research. We recommend further research using qualitative methods to attempt to explain these decisions better.

CONCLUSIONS

The present study was limited in its examination of a single department of a single public-sector organization with standardized promotion practices that included a panel review process. Results obtained from studying one department in this organization should not be generalized to other departments in the same organization or to other types of organizations without additional research. Further, analyses were restricted to a limited sample of 300 applicants because data on applicant race were not more widely available. These applicants were not statistically representative of the larger sample on employment in the hiring department because most of the missing race data were for outsiders. However, since multicollinearity among the predictor variables for these 300 applicants was low (Table 1), the impact of their nonrepresentativeness on the results as a whole may have been small. Finally, as in most field settings (Cox, 1990), this department had a fairly small number of people of color, especially women of color, applying for promotions. In fact, there were so few applicants from all minority groups that we combined them into one group for analyses. This practice may have masked differences in the treatment of members of different minority groups.

Ideal promotion practices do not guarantee that minority employees will fare as well as other employees when promotion decisions are made for top management positions. In the present study, the outcomes of such decisions were influenced by job-relevant factors, such as insider/outsider status and cumulative work experience. Race differences in these factors contributed to race differences in the outcomes of promotion decisions, even though race itself did not seem to be a basis for decision making. Thus, the study provides additional perspective on the factors that affect the progress of racial minorities in organizations (Ilgen & Youtz, 1986; Thomas & Alderfer, 1989). To explain why racial minorities encounter a glass ceiling that keeps them from attaining the upper levels of management (Morrison & Von Glinow, 1990), researchers need to consider more than the direct effect of race on promotion decisions for top management positions.

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PAYING THE PIPER: AN EMPIRICAL EXAMINATION OF LONGER-TERM FINANCIAL CONSEQUENCES OF ILLEGAL CORPORATE BEHAVIOR

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Longer-term performance effects of corporate illegality were investigated. Results show that firms experience lower accounting returns over five years and slower sales growth in the third through fifth year after a conviction. Stakeholders appear to paint all corporate wrongdoers with the same brush, ignoring the seriousness of illegalities, but responding strongly to multiple convictions for wrongdoing. Reduced financial performance does not deter subsequent illegality.

Anecdotal accounts of corporate wrongdoing color impressions of who engages in illegal activities and what happens to offending firms, but they offer unreliable data for assessing the consequences of wrongdoing. Food Lion paid $13.2 million into a fund for back wages, $2 million in civil fines, and another $1 million in fines for child-labor violations for forcing employees to work overtime without pay (Salwen & Ruffenach, 1993). Casual observers may suggest Food Lion suffered greatly for its misdeed, but company executives have claimed the settlement minimally impacted the firm, reducing earnings by only a penny per share and the firm's stock price by 12.5 cents per share (Salwen & Ruffenach, 1993). Media reports like those involving Food Lion prompt researchers and practitioners to question whether convicted firms "pay the piper" for wrongdoing through reduced longer-term financial performance, an issue we examined in our study.

We define *illegal corporate behavior* as unlawful activities of members or agents of a firm, engaged in primarily for the firm's benefit (Szwajkowski, 1985). Our definition includes both intentionally and unintentionally illegal acts (Baucus & Near, 1991); an example of the first would be conspiring with competitors to fix prices, and an example of the second would be failing to recognize serious harm to consumers that could result from their using a firm's product. By *longer-term performance,* we refer to accounting and market returns measured over the period one through five years after a conviction, in contrast to returns over a few days or weeks.

Our study has important implications for corporations and society. Clinard (1990: 15) estimated that corporate illegality cost up to $200 billion a year but that street crime cost $3–4 billion. The magnitude of the costs involved spurred lawmakers to establish stricter sentencing guidelines to punish and deter wrongdoing. Lawsuits against corporate officers demonstrate the courts' willingness to hold executives responsible for their firms' illegal acts (Mathews, 1988).

Despite concern with punishing and deterring illegality, researchers have conducted few analyses of its links with longer-term performance. We examined longer-term financial performance consequences in the first through the fifth year following a conviction, and we explored whether consequences vary with the seriousness, type, and number of violations. We also analyzed firm performance and subsequent illegality, determining whether firms experiencing negative consequences of wrongdoing engaged in less repeated illegality than other firms.

EXTENSION OF BAUCUS AND NEAR'S RESEARCH

Our study extends Baucus and Near's (1991) research, using their sample of firms. They focused on *causes*, or predictors, of corporate illegality, and we examined financial *consequences*, or what happens after a firm engages in and is convicted of illegal acts. Thus, we extended the earlier research by completing the model of the corporate illegality process initiated by Baucus and Near. They examined the period from 19 years before a given conviction to the conviction year, and we examined the conviction year and the next 5 years.

Baucus and Near compiled a sample of *Fortune* 500 firms for which clear evidence of wrongdoing existed, examining firms convicted by the courts during the 1974–83 period for four types of illegality. They provided complete descriptions of (1) per se antitrust violations, (2) product liability and punitive damages, (3) disparate treatment, which involves intentional discrimination, such as not hiring or promoting minorities, and disparate impact discrimination that occurred after landmark cases established disparate impact as illegal, and (4) other violations, such as intentional patent infringement, violating a consent degree, or intentional securities fraud (Baucus & Near, 1991: 18–19). These violation types involve cases in which the law rests on the assumption that managers knew or should have known of the illegality of their actions, and the courts established the firms' guilt (Baucus & Near, 1991: 11).

Samples used by prior researchers (e.g., Clinard, Yeager, Brissette, Petrashek, & Harries, 1979; Cochran & Nigh, 1987; Staw & Szwajkowski, 1975) may not reveal connections between illegality and subsequent financial performance, since they combine serious violations with regulatory and relatively minor offenses, such as failing to file required paperwork with the Occupational Safety and Health Administration. These cases often result in settlements, pleas of nolo contendere, or consent decrees that do not estab-

lish the firms' guilt. Stakeholders may exhibit little reaction, since scant evidence of illegality exists and the firms often deny wrongdoing.

Product recall studies illustrate the sampling design problem. Jarrell and Peltzman (1985) showed that shareholders' losses exceeded the direct costs of recalls, negatively affecting firm performance and reputation. Later, Hoffer, Pruit, and Reilly (1988) reported no negative abnormal returns following product recalls. They attributed Jarrell and Peltzman's results to an artifact of their sample, which included 21 nonrecall events, omitted 16 recalls meeting the study's criteria, and included recalls with overlapping windows. The sampling problem Hoffer and colleagues identified applies to studies of corporate illegality, since empirical results likely vary across samples involving illegal activities and those including questionable behavior and wrongly accused firms. We examined only convicted firms, allowing us to determine whether sanctions for "clearly illegal" behavior (Baucus & Near, 1991) have a longer-term relationship with performance.

SHORT-TERM CONSEQUENCES OF CORPORATE ILLEGALITY

Researchers tend to portray managers as utilitarian, engaging in illegality to improve firm performance (Clinard & Yeager, 1980; Cochran & Nigh, 1987). Some theorists describe managers as making rational decisions about how illegality benefits firms: "The decision to engage in dubious behavior is a function of the *probability* of detection times the *cost* of punishment if detected minus the *income* that can be gained from selling the product, all adjusted for the company's *preference for risk*" (Becker, cited in Bromiley and Marcus [1989: 242]). Researchers often assume that managers recognize the costs of wrongdoing and the likely negative impact on performance if illegality is detected and punished.

Consistent with this utilitarian perspective, researchers have examined short-term market reactions to alleged illegality, contending that efficient markets adjust quickly to new or unanticipated information. Stock prices decline in the week following the announcement of government prosecutions for antitrust violations (Randall & Neuman, 1979), and stock market performance drops by an average of 2 percent following the announcement of final decisions or penalties for illegal acquisitions and mergers (Wier, 1983: 208). Allegations of bribery, tax evasion, illegal political contributions, criminal fraud, or certain antitrust activities negatively affect a firm's stock on the day before and the day of an announcement (Strachan, Smith, & Beedles, 1983). Thus, clear evidence exists that stock markets react emphatically in the short term to information concerning prosecution and penalties for wrongdoing.

CORPORATE ILLEGALITY AND LONGER-TERM PERFORMANCE

Longer-term performance measures better capture conviction-performance relationships since firms suffer prolonged damage from illegality. Managers may mount defensive efforts to mitigate short-term effects of

wrongdoing, and convicted firms incur direct costs of sanctions (e.g., fines and punitive damages) and protracted legal costs from litigation and appeals. Illegality takes money from strategic investments, hurts a firm's image with its stakeholders (Elkins, 1976), and reduces sales volume or raises capital costs (Komisarjevsky, 1983). Even in the stock market, with its rapid shareholder responses, firms experience prolonged consequences. Institutional investors held $5 trillion in assets and 45 percent of corporate equity in 1988 (Brancato, 1990), and their size and proximity to the overall market limits their ability to move holdings (Chaganti & Damanpour, 1991), making institutional investors "reluctant activists" (Pozen, 1994).

Researchers question the existence and timing of negative consequences, suggesting managers defray short-term impacts. Bromiley and Marcus (1989) reported few short-term negative consequences for dubious behavior; in fact, 40 percent of the automotive firms they sampled experienced positive abnormal returns shortly after a recall. Marcus and Goodman's (1991) study of market reactions to signals management sends on the day before and the day of an announcement of a crisis—an accident, product safety incident, or scandal—indicated the market did not react significantly to misconduct. They argued that "it may take years before the true impact of managerial actions can be understood" (1991: 300), and researchers have not examined consequences over a long enough time period. Thus,

> *Hypothesis 1: Illegal corporate behavior relates negatively*
> *to the longer-term financial performance of convicted*
> *firms measured relative to that of unconvicted firms.*

Seriousness of Illegality and Firm Performance

Longer-term consequences of illegality may vary with the seriousness of wrongdoing, since serious violations are more likely to result in heavy fines and other penalties, damage to a firm's reputation, and much negative publicity. Few researchers, however, have examined differences in consequences depending on the seriousness of the violation.

Jarrell and Peltzman's (1985) investigation of short-term stock market performance following recalls of pharmaceutical products posing serious health hazards suggested firms engaging in serious misconduct experience negative abnormal returns, but they did not compare results for serious and minor violations. Randall and Neuman's (1979) study of market reactions to announcements of legal action against firms for antitrust violations showed that short-term stock market declines related to the seriousness of charges against firms, rather than simply reflecting normal stock market fluctuations. A case study of four firms indicated that product defects negatively impacted firm sales and market share for all firms in the six months following the incidents, but in the three less serious cases, firms minimized the decline by acting quickly once they discovered the problems (Weinberg & Romeo, 1989). Stakeholders appear to react more strongly to serious illegal activity than to fairly minor illegal activity, leading us to our second prediction.

> *Hypothesis 2: The seriousness of an illegal corporate act relates negatively to the longer-term financial performance of convicted firms measured relative to that of unconvicted firms.*

Multiple Convictions and Firm Performance

Sanctions and stakeholder reactions should be greater for firms with histories of violations than for first-time violators and unconvicted firms. Multiple-conviction firms have established a pattern of illegality, lack credibility when they try to convince the courts and stakeholders of their innocence, and often incur more severe sanctions. Multiple convictions may cumulatively affect economic performance, leading to bankruptcy in extreme cases (Barney, Edwards, & Ringleb, 1992). Wokutch and Spencer (1987) did not observe performance differences between firms with one versus more than one antitrust violation, but the small size of their sample (13 firms) likely affected their results. In line with the literature, we hypothesize that firms convicted of multiple violations over a five-year period experience greater performance consequences than other firms.

> *Hypothesis 3: Multiple convictions relate negatively to firms' longer-term financial performance measured relative to that of unconvicted firms and single-conviction firms.*

Type of Illegality and Firm Performance

The consequences of illegality may vary with the type of violation. Firms experience decline in growth (measured as number of employees) following penalties for trade violations, but labor violations do not uniformly affect such growth (Lane, 1953–54). Investors respond more negatively to replacements and refunds for defective products than to repairs and inspections (Davidson & Worrell, 1992). Investors exhibit strong negative reactions to price-fixing allegations, but not to political payoffs (Strachan et al., 1983). These studies show consequences differ by type of illegality; however, little theoretical support exists for proposing relationships with specific violation types, so we investigated this research question: Do relationships between firms' convictions for illegal activity and longer-term financial performance vary by type of conviction?

Firm Performance and Subsequent Violations

Firms may develop an aberrant corporate culture that condones or encourages illegal behaviors. "Successful achievement of organizational goals through unlawful conduct tends to reinforce the occurrence of this behavior, so what society defines as illegal may be defined in the organization as normative" (Vaughan, 1983: 61). Sanctions may have minimal impact on a firm, particularly compared with gains from illegality. E. F. Hutton's fraudulent check-kiting activities earned between 4 and 10 billion dollars, a gain

minimally reduced by the $215 million fine levied against the firm (Carpenter and Feloni, cited in Schlegel [1990: 23]). Improved performance following illegal activities may encourage a firm to repeat illegal acts, consider illegal solutions to other problems, or predispose managers to select activities that result in illegality (Baucus, 1994). Firms experiencing few negative consequences following an initial conviction likely engage in subsequent illegality, but firms suffering lower performance after a conviction may try to minimize the chances of repeated illegal activity.

> *Hypothesis 4: Firms with a single conviction for illegal corporate behavior will experience lower financial performance in the first year following conviction than both unconvicted firms and multiple-conviction firms.*

METHODS

Sample

We used firms in the *Fortune* 300 [1] in 1978, obtaining data on convicted firms from Baucus and Near's (1991) database. They gathered information on 74 firms convicted during the period 1974–83: 51 firms with one, 16 with two, and 7 firms with three or more convictions. All were cases in which the law deemed that decision makers knew or should have known that their acts were illegal, and in which the courts found the firms guilty.

Of the firms in our initial sample, 38 were acquired or merged during the period 1974–83, reducing our sample to 68 convicted and 194 unconvicted firms. Unconvicted firms may have engaged in illegality or participated in questionable or unethical behavior, an issue we could not address since they had escaped detection, prosecution, and conviction for illegal acts. We considered matching our 68 convicted firms with unconvicted ones by size and industry; however, 24 of the top 50 firms in the *Fortune* 300 (41 of the top 100) were convicted during the study period, so there were few or no unconvicted firms in some industries, such as automotive products, paper products, and petroleum refining. Thus, we used the *Fortune* 300 firms and controlled statistically for the background variables of size and industry membership.

We measured the performance of convicted firms for five years, beginning in the year following a conviction. We randomly assigned a target year to unconvicted firms, creating a distribution resembling that of convicted firms over the period 1974–83, and we examined performance for five years after the target year.

Measures

Performance. We used three performance measures. A fourth measure, return on equity, produced results very similar to return on assets, so we have excluded it from our presentation of results.

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[1] This group is the top 300 firms on the *Fortune* 500 list.

Shareholder returns represent change in stock price from one year to the next. We used stock price data from *Moody's Common Stocks* to compute the change in price over the year following a conviction or a target year, and the average change in shareholder returns over a five-year period. We used shareholder returns over one and five years since we were interested in longer-term consequences.

Return on assets (ROA) was measured as income before extraordinary items and discontinued operations, plus interest expense, divided by total assets. We used ROA in the year after a conviction or target year and computed a five-year average of ROA for our analysis.

Return on sales (ROS) provides insights into firms' earnings for a given level of economic activity. In a post hoc analysis, we investigated whether firms experienced declining sales and declining earnings as a percentage of sales. We used ROS rather than sales, since a positive sales-conviction relationship simply indicates that bigger, more visible, firms experience more convictions. We calculated one-year and five-year average measures of ROS as income before taxes, divided by total sales. We obtained data on ROA and ROS from Standard & Poor's COMPUSTAT database.

Illegal behavior. We investigated the consequences of corporate illegality for our 68 convicted firms following the final appellate court decision in each case. Firms normally appeal earlier adverse decisions and likely experience the greatest consequences after the final decisions, which establish their guilt and inform stakeholders of the sanctions deemed appropriate. Four measures captured illegal behavior: conviction, seriousness, multiple convictions, and type of illegality. *Conviction* was a dichotomous variable coded 1 if a firm was convicted of a violation and 0 if no convictions existed.

We could not assess *seriousness* using the dollar value of sanctions since laws limited allowable damages in some cases, and plaintiffs sought nonmonetary remedies, such as injunctions, in other cases. We relied on Clinard and colleagues' (1979) criteria to measure seriousness but modified them slightly, since all of our cases encompassed acts the courts assumed involved intent. We used Clinard and colleagues' three-point scale, which rates violations as ranging from somewhat serious to very serious. Somewhat serious violations (coded 1) were fairly short in duration, not repeated, affected few individuals, and did not result in major losses for those individuals. Moderately serious violations (coded 2) met some of the general rules for minor violations, but they also involved a more serious issue, such as physical injuries or monetary losses. Very serious violations (coded 3) were repeated or persisted over a long period, affected a large group, and involved major losses. When cases involved extraordinary circumstances—violations of consent decrees or other court rulings despite warnings from the courts—the initial illegal actions were also coded as very serious. Two raters independently assessed seriousness, and their ratings exhibited a high level of agreement ($r = .84$). We averaged the two ratings for seriousness when raters disagreed. Our sample contained 23, 20, and 25 firms with somewhat, moderately, and very serious violations, respectively.

Multiple convictions. We created a variable representing the number of additional convictions a firm received in the same year as its initial conviction, or during the five-year post-conviction period. The sample contained 47 firms with one conviction, 15 firms with one extra, 4 firms with two, and 2 firms with three or more additional convictions.

Type of violation. The sample included four types of illegality (Baucus & Near, 1991): *discrimination,* involving disparate treatment (e.g., not hiring or promoting African Americans or women) or disparate impact that occurred after landmark cases defined disparate impact as illegal; *per se antitrust,* such as price fixing, bid rigging, or horizontal division of customers and territories; *product liability with punitive damages;* and *other,* such as violating a consent decree, intentional securities fraud, or intentional patent infringement. We created four dichotomous variables, one for each type of illegality, and coded each as 1 if a firm was convicted and as 0 if the firm was not convicted of that type of illegality.

Subsequent convictions. We operationally defined subsequent convictions as those occurring after an initial one—either during the five-year post-conviction period that we used to measure performance in the rest of the study, or in any year after that period until 1983. We coded our subsequent conviction variable as 0 for unconvicted firms, 1 for firms with a single conviction (no subsequent illegalities), and 2 for firms convicted of subsequent violations.

Covariates. Performance among *Fortune* 300 firms varies with firm size and industry, so we used those variables as covariates. Larger firms have greater resources and influence over stakeholders than smaller firms. We measured firm size as number of employees since sales and assets were used to compute performance measures. Average profitability varies by industry, so we controlled for effects of industry membership with 11 dichotomous variables, each coded 1 if it represented a firm's primary industry (by two-digit Standard Industrial Classification code), and 0 if it did not. Industries included metal products, forest and paper products, chemicals, pharmaceuticals, soaps and cosmetics, foods, industrial and farm equipment, computers and office equipment, transportation and utilities, wholesale and retail trade, and a miscellaneous group. We do not report regression coefficients for covariates, since they did not represent a primary focus or produce meaningful results.

Data Analysis

Our selection criteria and data collection method limited our sample size, creating the possibility that individual firm performance could drive our results. We took precautions to identify such instances, analyzing the normality of distributions of performance measures in scatter graphs and eliminating seven outliers from our analysis: 1 multiple-conviction firm and 6 unconvicted firms had returns on assets exceeding −40 or +40 percent or market returns above 60 percent, values at least four standard deviations different from mean values. This process left 188 unconvicted and 67 con-

victed firms in our analysis; 47 of the latter had one conviction, and 20 had multiple convictions.

We employed analysis of covariance procedures from the statistical package SPSS-X, comparing performance for convicted and unconvicted firms and controlling statistically for firm size and industry. We conducted separate analyses for each performance measure in the first year and the five years after a conviction (or target year), adding size and industry as covariates, and then one of the independent variables. We temporarily omitted firms and repeated analyses to examine the stability of our results: our regression coefficients and F-statistics remained reasonably stable. We investigated the relationship between performance after an initial conviction and subsequent convictions using one-way analysis of variance, comparing the performance of firms with no, one, and subsequent convictions. We used performance in the year after a conviction to test the deterrent effect of low performance on subsequent violations (Hypothesis 4) and examined patterns of performance in the five-year post-conviction period to compare groups across time.

RESULTS

Table 1 reports means, standard deviations, and correlations. Measures of illegality related negatively to our performance measures. Conviction, seriousness, and multiple conviction correlated highly, so multicollinearity problems prevented us from examining these three variables in the same regression equations. However, the illegality literature treats these as separate variables; too, conviction and seriousness correspond to one incident of illegality, but multiple convictions correspond to separate illegal acts. Thus, we did not combine the three independent variables into a single scale.

Longer-Term Consequences

Our results, shown in Table 2, supported Hypothesis 1: corporate illegality relates negatively to the longer-term performance of convicted firms

TABLE 1
Means, Standard Deviations, and Correlations[a]

Variables	Mean	s.d.	1	2	3	4	5	6
1. ROA	6.35	3.70						
2. ROS	9.23	8.62	.41**					
3. Stockholder returns	14.28	10.82	.20**	-.01				
4. Employees[b]	46.84	69.36	.06	.05	-.11			
5. Conviction[c]			-.18**	-.16**	-.13*	.17**		
6. Seriousness[c]			-.17**	-.13*	-.16*	.20**	.92**	
7. Multiple convictions[c]			-.20**	-.15*	-.13*	.38**	.84**	.80**

[a] N ranges from 238 to 254.
[b] Reported in thousands, ranging from 1.39 to 795.2.
[c] Dichotomous or categorical variable.
* $p < .05$, two-tailed test
** $p < .01$, two-tailed test

TABLE 2
Results of Regression Analysis for Performance over Five Years following Conviction[a]

Variables	ROA			ROS			Shareholder Returns		
	1	2	3	1	2	3	1	2	3
Constant	9.32**	8.45**	8.87*	0.10**	0.08**	0.09**	0.22**	0.20**	0.19**
	(0.92)	(0.72)	(0.73)	(0.01)	(0.01)	(0.01)	(0.03)	(0.02)	(0.02)
Conviction	-1.34**			-0.02**			-0.03		
	(0.53)			(0.01)			(0.02)		
Seriousness		-0.57*			-0.01			-0.01	
		(0.26)			(0.00)			(0.01)	
Multiple convictions			-1.04**			-0.02**			-0.01
			(0.30)			(0.01)			(0.01)
R^2[b]	15.73	15.73	15.73	19.52	19.52	19.52	8.25	8.25	8.25
F[b]	3.76**	3.76**	3.76**	4.64***	4.64***	4.64***	1.69	1.69*	1.69
ΔR^2[c]	2.20	1.87	3.51	2.84	1.19	3.84	1.32	1.46	0.76
ΔF	8.47**	5.46*	10.48**	8.37**	3.43*	11.46**	3.28	3.63*	1.88
df	12, 242	12, 242	12, 242	13, 229	13, 229	13, 229	12, 225	12, 225	12, 225

[a] All equations contain 11 industry dummy variables and number of employees as covariates. Unstandardized regression coefficients are reported. Standard errors are in parentheses.

[b] Summary statistic for the covariates only.

[c] Summary statistic reflecting the influence of the conviction variables. To derive a total R^2, add the R^2 for the covariates and the ΔR^2.

$* \ p < .05$

$** \ p < .01$

measured relative to that of unconvicted firms. Convicted firms earned significantly lower returns on assets than unconvicted firms over the five years following initial convictions, as indicated by a 2.20 percent increase in R^2.

Convicted firms also experienced lower sales growth and less income from a given level of sales than unconvicted firms. R^2 increased 2.84 percent when we regressed conviction on ROS, as reported in Table 2. A post hoc analysis (Figure 1) revealed that convicted firms experienced lower, but not statistically significantly lower, sales growth than unconvicted firms in the first and second years following conviction; they generated significantly lower sales growth in the third, fourth, and fifth years than unconvicted firms. The most pronounced difference occurred in the fourth year, when convicted firms had a 6.13 percent change in sales versus a 9.84 percent change for unconvicted firms. In sum, a conviction for wrongdoing related negatively to longer-term earnings from sales (Table 2), with differences in sales growth showing up in the third through the fifth year following conviction (Figure 1).

We did not find complete support for Hypothesis 1 since illegality does not relate significantly to stockholder returns over the five-year period. Investors responding quickly to information about corporate illegality may discount an event (here, a conviction) thereafter, as event studies have

FIGURE 1
Growth in Sales per Year over Five Years
for Convicted and Unconvicted Firms
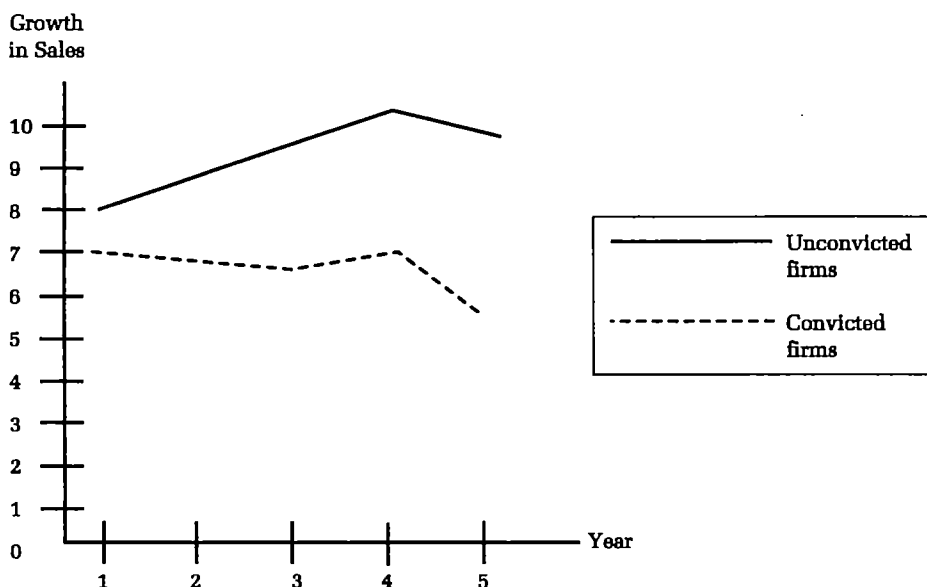
TABLE 3
Results of Regression Analysis for Performance in the First Year after Conviction[a]

Variables	ROA			ROS			Shareholder Returns		
	1	2	3	1	2	3	1	2	3
Constant	9.83**	9.11**	9.37**	0.11**	0.09**	0.10**	0.31**	0.26**	0.22**
	(0.91)	(0.70)	(0.72)	(0.01)	(0.01)	(0.01)	(0.09)	(0.07)	(0.07)
Conviction	-1.29**			-0.03**			-0.07		
	(0.51)			(0.01)			(0.05)		
Seriousness		-0.64**			-0.01**			-0.03	
		(0.24)			(0.00)			(0.02)	
Multiple convictions			-0.97**			-0.02**			-0.01
			(0.32)			(0.01)			(0.03)
R^2[b]	20.23	20.23	20.23	13.93	13.93	13.93	9.74	9.74	9.74
F[b]	4.84**	4.84**	4.84**	3.09**	3.09**	3.09**	2.05*	2.05*	2.05*
ΔR^2[c]	2.13	2.25	3.17	3.11	2.48	4.07	0.91	0.71	0.03
ΔF	8.59**	7.36**	9.45**	8.55**	6.78*	11.30**	2.33	1.79	0.05
df	12, 229	12, 229	12, 229	12, 229	12, 229	12, 229	12, 229	12, 229	12, 229

[a] All equations contain 11 industry dummy variables and number of employees as covariates. Unstandardized regression coefficients are reported; standard errors are in parentheses.

[b] Summary statistic for the covariates only.

[c] Summary statistic reflecting the influence of the conviction variables. To derive a total R^2, add the R^2 for the covariates and the ΔR^2.

* $p < .05$

** $p < .01$

shown (Randall & Neuman, 1979; Strachan et al., 1983; Wier, 1983). Other stakeholders' reactions—measured as ROA and ROS—hurt longer-term performance, strongly supporting Hypothesis 1.

Results of the regression for the first year after conviction (Table 3) produced results similar to those for the five years. Convicted firms showed lower ROA and ROS (R^2s increasing 2.13 and 3.11 percent, respectively), but stockholder returns did not differ significantly. Thus, results over one and five years supported Hypothesis 1.

Seriousness

Hypothesis 2 predicts that the seriousness of a violation relates negatively to the longer-term performance of convicted firms measured relative to that of unconvicted firms. The results shown in Table 2 reveal statistically significant links between seriousness and ROA over five years but nonsignificant relationships between seriousness and both ROS and stockholder returns over five years. Seriousness also relates significantly to ROA and ROS in the first year following a conviction (Table 3). We did not interpret these results as supporting Hypothesis 2, since seriousness did not

TABLE 4
Results of Regression Analysis for Type of Violation with Performance over Five Years following Conviction[a]

Variables	ROA	ROS	Shareholder Returns
Constant	8.44**	0.08**	0.17**
	(0.65)	(0.01)	0.02
Product liability	−1.90	−0.05	−0.21**
	(2.32)	(0.04)	(0.07)
Antitrust	−1.53	−0.01	−0.01
	(0.85)	(0.01)	(0.03)
Discrimination	−1.44*	−0.03**	−0.03
	(0.65)	(0.01)	(0.02)
Other	−1.47	−0.02	−0.02
	(0.95)	(0.01)	(0.03)
R^2[b]	19.19	19.52	7.75
F[b]	4.43**	4.65**	1.58
ΔR^2	3.06	3.78	3.95
ΔF	2.17	2.78*	2.47*
df[c]	16, 220	16, 226	16, 221

[a] All equations contain 11 industry dummy variables and number of employees as covariates. Unstandardized regression coefficients are reported; standard errors are in parentheses.

[b] Summary statistic for the covariates only.

[c] Summary statistic reflecting the influence of the conviction variables. To derive a total R^2, add the R^2 for the covariates and the ΔR^2.

* $p < .05$
** $p < .01$

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FIGURE 2
Patterns of Performance over Five Years
with Multiple Comparisons of Group Means

(a) ROA

1&3	1&3	—	1&3	1&3
			2&3	

Multiple comparison tests (Scheffé test with $p < .05$)[a]

(b) ROS

—	1&2	—	—	—

Multiple comparison tests (Scheffé test with $p < .05$)[a]
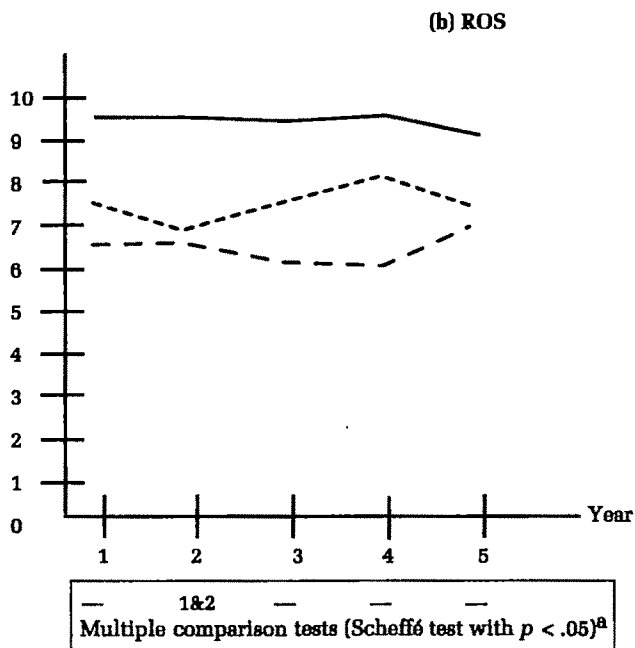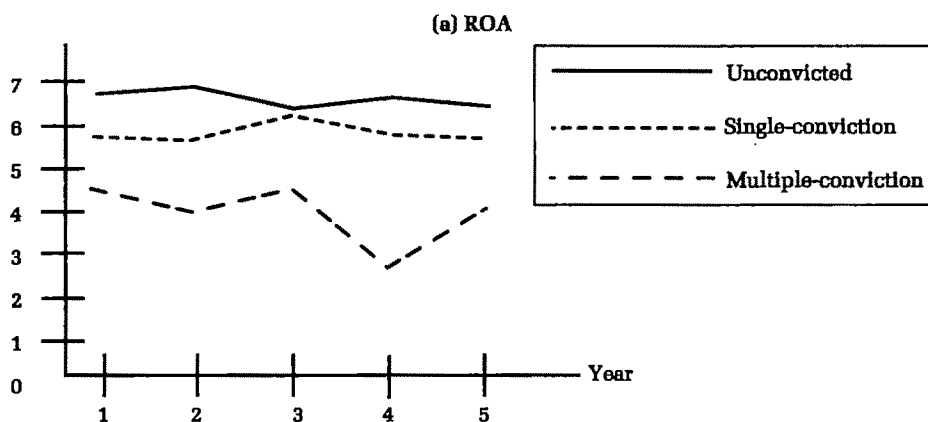
Figure 2 (continued)

(c) Shareholder Returns

No significant differences exist among group means.

^{a}1 = Unconvicted.
2 = Single-conviction.
3 = Multiple conviction.
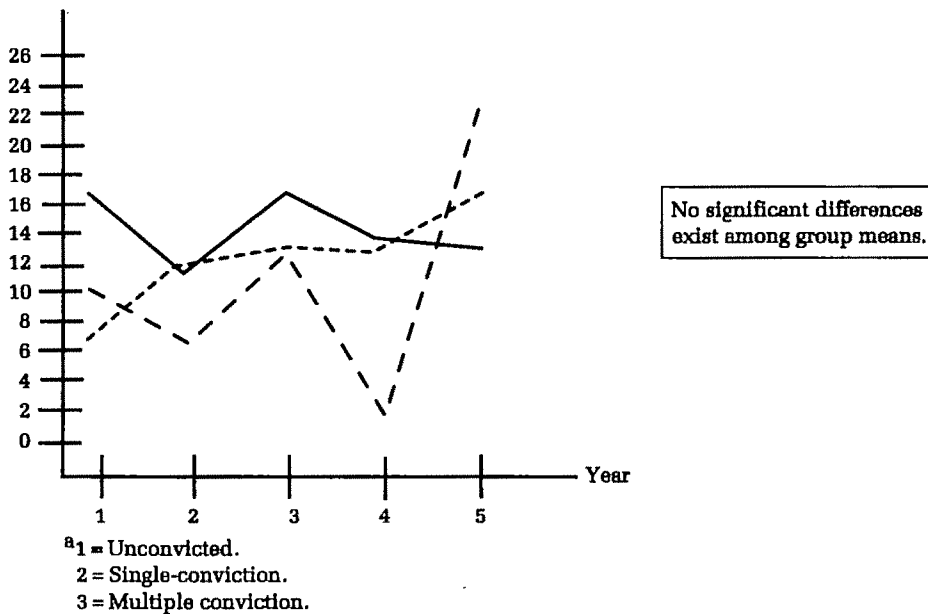
improve the predictive ability of our analysis, explaining less variance in most cases than the dichotomous variable for conviction. (The reader should compare changes in R^2 in models 1 and 2 for each dependent variable in Tables 2 and 3.)

We conducted a post hoc analysis to test two assumptions: (1) our seriousness measure simply captured performance differences between convicted and unconvicted firms, and (2) a curvilinear relationship existed between seriousness and performance, a possibility indicated by scatter graphs, whereby firms convicted of moderately serious illegality might have performed better than those with minor or very serious violations. We tested these assumptions by omitting unconvicted firms—thus controlling for performance differences linked to conviction—and by standardizing our measure of seriousness, squaring it, and in turn entering seriousness, seriousness squared, or the combination into regression equations. Our analysis of links between seriousness, ROA, ROS, and shareholder returns (results are not shown) did not yield significant results. Seriousness did not provide additional information useful in understanding relationships between corporate illegality and longer-term performance.

Thus, our results did not support Hypothesis 2. The seriousness of a violation related negatively to the longer-term financial performance of convicted firms but, when we controlled for differences in performance attributable to conviction, seriousness-performance links disappeared. We discuss this result in our conclusion, suggesting that stakeholders may not

distinguish among levels of seriousness, and researchers need to incorporate other measures of seriousness.

Multiple Convictions

Except in the case of shareholder returns, our results strongly support Hypothesis 3. Multiple convictions—additional convictions in the year of an initial conviction or during the next five years—relate negatively to the longer-term financial performance of firms measured relative to that of unconvicted firms, accentuating the impact of wrongdoing. Multiple convictions explain more of the variance in ROA and ROS than a single conviction does (Table 3). The multiple conviction measure yields statistically significant coefficients in our one- and five-year analyses, with R^2 increasing 3.17 and 4.07 percent, and 3.51 and 3.84 percent, respectively. Multiple convictions have a fairly substantial negative relationship with firm performance in the year of a conviction and over the next five years.

The presence of a conviction or of multiple convictions explains between 2.13 and 4.07 percent of the variance in performance, but readers may wonder about actual percentage differences in performance for firms. We calculated predicted values of performance for unconvicted, single-conviction, and multiple-conviction firms using multiple conviction as the independent variable in regression equations. The results reveal performance differences among groups (results are not shown in tables). Firms with one conviction and those with multiple convictions yielded 1.17 percent and 2.58 percent lower returns on assets and 2.39 percent and 4.23 per-

TABLE 5
Results of One-Way Analysis of Variance Comparing First-Year
Performance for Unconvicted, Single-Conviction, and
Multiple-Conviction Firms[a]

Performance Measure	Group Means	Source	df	Sum of Squares	Mean Squares	F	p
ROA							
1	6.79[b]	Between	2	0.01	0.01	4.84	.009
2	5.87	Within	251	0.03	0.00		
3	4.33						
ROS							
1	9.72	Between	2	0.03	0.01	4.05	.019
2	7.39	Within	239	0.96	0.00		
3	6.52						
Shareholder returns							
1	16.26	Between	2	0.37	0.19	1.78	.172
2	6.41	Within	232	24.2	0.10		
3	9.87						

[a] N varies from 235 to 253. Unconvicted = 1, single-conviction = 2, multiple-conviction = 3.

[b] Multiple comparison (Scheffé) tests yielded statistically significant differences in means for groups 1 and 3 for ROA at the $p < .05$ level.

cent lower returns on sales than unconvicted firms, respectively. The analysis for shareholders' returns yielded significant differences among groups, even though our regression analysis of the raw data showed no relationships: predicted shareholder returns for firms with one and multiple convictions were respectively 1.58 and 4.25 percent lower than those of unconvicted firms. Multiple comparison (Scheffé) tests yielded differences in mean predicted values for unconvicted firms and multiple-conviction firms (groups 1 and 3) and for single-conviction and multiple-conviction firms (groups 2 and 3) for all performance measures at the $p < .05$ level. Our results strongly support Hypothesis 3: multiple-conviction firms reported markedly lower returns than unconvicted firms.

Type of Conviction

Table 4 contains results of our analysis of type of conviction and longer-term performance. Convictions for discrimination relate negatively with ROA and ROS, and antitrust violations relate negatively with ROE (results not shown). Product liability convictions with punitive damage awards—the most egregious type of product liability violation—yield a negative relationship with shareholders' returns. Other types of illegality do not relate significantly to firm performance. Changes in R^2 varied from 3.06 to 3.95 percent. These results support our research question: types of violations have differential impacts on the longer-term performance of convicted firms measured relative to that of unconvicted firms.

Subsequent Convictions

Hypothesis 4, predicting that firms with one conviction experience lower performance in the first year following that conviction than multiple-conviction and unconvicted firms, was not supported (Table 5). Unconvicted firms outperformed all other firms in our sample, as expected. Firms with one conviction and multiple convictions reported 0.92 percent and 2.46 percent lower ROA and 2.33 percent and 3.20 percent lower ROS than unconvicted firms, respectively. The analysis of shareholders' returns yielded a nonsignificant F. Multiple comparison (Scheffé) tests yielded significant differences in the means for unconvicted (group 1) and multiple-conviction firms (group 3) for ROA. Thus, firms with one conviction experienced lower performance in the year following that conviction than unconvicted firms, but multiple-conviction firms experienced the lowest performance for accounting returns, so there was no support for Hypothesis 4.

We conducted a post hoc analysis to examine the pattern of performance over five years. Figure 2 shows mean values for performance in each year and significant differences among groups for multiple comparison (Scheffé) tests. Unconvicted firms outperformed multiple-conviction firms in years one, two, four, and five and single-conviction firms in year four for ROA. Unconvicted firms generated greater ROS than single-conviction firms in year two. Multiple-conviction firms consistently produced low performance and, to the extent that some convictions occurred in years two through five, low performance precedes the courts' penalties for wrongdoing.

The pattern for shareholders' returns over the five-year period, shown in Figure 2, may explain the disparity in results between accounting and market measures. We interpret the graph for shareholders' returns with caution, since no statistically significant differences exist. Unconvicted firms outperformed single- and multiple-conviction firms in the first year after a conviction (Table 5), but not in the second through the fifth year—yielding the lowest returns in year five. Single-conviction firms experienced the lowest performance in year one but had consistently increasing returns over years two through five. Multiple-conviction firms exhibited the greatest volatility over the five years, possibly reflecting subsequent convictions and defensive activities. This analysis suggests that shareholders' responses to corporate illegality, which are revealed in market measures, differ greatly from the responses of other stakeholders, which are shown in accounting returns.

DISCUSSION

Our results suggest that firms "pay the piper" for corporate illegality through lower longer-term performance. We summarize the contributions, limitations, and implications of our study.

Contributions

Our study contributes to the corporate illegality literature by demonstrating the existence of relationships with longer-term performance and showing that relationships vary across performance measures. Convicted firms generate lower accounting returns (ROA and ROS) in the first year and over the five years after a conviction, possibly reflecting lower revenues or higher costs. These firms experience immediate and prolonged reductions in revenues as stakeholders (e.g., customers) exit the firms, and they may incur increased longer-term costs associated with acquiring capital, alleviating employee concerns, and attempting to stop the exodus of customers.

Convicted firms experience reduced sales growth in the period three through five years after a conviction, indicating that customers may react more slowly to wrongdoing than other stakeholders. Managers employ defensive tactics (Wokutch & Spencer, 1987), smoothing the immediate impact of convictions on sales by advertising, reducing prices, or shipping products within the fiscal year to overstate revenues. Publicity concerning a conviction may temporarily boost sales, mirroring effects reported in Elsbach and Sutton's (1992) analysis of illegitimate activities. Firms employing defensive initiatives experience immediate decreases in returns; however, defense initiatives and publicity have a temporary positive impact on sales, and the drop in sales shows up in years three through five.

The seriousness of violations did not relate differentially to longer-term performance, suggesting stakeholders paint all convicted firms with the same brush. A conviction may stain a firm's image, send a warning signal to stakeholders, or prompt stakeholders to reassess relationships with the firm, regardless of its seriousness. Alternatively, our sample—firms for which

clear evidence of wrongdoing existed—may have all engaged in activities that stakeholders regarded as very serious, relative to other dubious but not illegal actions. Then, too, our three-point measure of seriousness may not have captured various dimensions stakeholders use to evaluate seriousness, a limitation we discuss later.

Our study showed that multiple convictions accentuate the negative relationship between illegality and longer-term performance. Firms convicted of multiple violations in the same year as or during the five years following an initial conviction reported lower returns than unconvicted firms and those with single convictions. Stakeholders likely exit their relationships with multiply convicted firms, and courts show them less leniency. Thus, managers should worry about damage to a firm's reputation and strive to avoid the label of corporate wrongdoer.

Our results indicate that stakeholder groups respond to certain types of wrongdoing but not to others and react at different times to different types. Researchers have shown that antitrust violations prompt short-term reductions in firms' stock prices, and our results reveal that firms incur lower shareholder returns after product liability violations with punitive damages. Lower accounting returns follow convictions for antitrust activities and discrimination.

We corroborated prior event studies showing investors respond quickly to corporate wrongdoing. We also revealed a relationship between longer-term performance and product liability violations with punitive damages. These product liability convictions have lasting impacts, damaging a firm's brand name or reputation, undermining its market position, generating litigation and negative publicity, and threatening firm survival. Other types of violations generate less lasting concern among investors.

Our study revealed that decrements in financial performance do not deter subsequent illegality. Firms with single convictions had higher returns in the year after conviction than multiple-conviction firms. Multiple-conviction firms continued to post lower accounting returns than other firms over five years. Although low performance does not deter subsequent illegality, single-conviction firms may suffer nonmonetary consequences, which were not included in our analysis, that discourage repeated wrongdoing, such as negative publicity, nonmonetary sanctions, and costs like recalls and mandatory training for employees. Single-conviction firms may more successfully engage in defensive activities, minimizing the convictions' impacts on reputation and performance.

Limitations

We cannot infer causality from our study, an issue for future analyses. Convicted firms report lower returns over five years and generate less sales growth in the period three through five years following conviction, but our data revealed that low performance preceded some convictions. Firms with multiple convictions earned lower accounting returns before they engaged in subsequent violations. Longer-term and delayed conviction-performance

relationships also prevent us from ruling out the influence of other variables. We cannot conclude that convictions cause low performance, but we also hesitate to infer that low performance prompts managers to engage in illegal activities (that performance causes wrongdoing). Our study demonstrates that a relationship exists between convictions and low performance. Both could reflect poor management or be driven by antecedents identified by Baucus and Near (1991).

Researchers should continue to improve the breadth and quality of the measures used to capture relationships between wrongdoing and performance. We looked at links with firms' financial performance, but other important consequences, such as morale and turnover among the employees of convicted firms, the cost and extent of organizational changes necessitated by the revelation of corporate wrongdoing, and the effect of firm probation or community service, should also be investigated. Also, our measure of seriousness may have prevented us from observing a conviction-performance relationship. Cohen (1991) noted that cases involving a high level of monetary harm—activities we would likely have categorized as very serious—typically included greater nonmonetary penalties, such as damage to a firm's reputation, other sanctions, and out-of-court settlements. Problems in gathering data on and quantifying these other consequences prevented us from examining the full package of sanctions, but researchers should continue to try and develop ways to assess broader performance implications.

Our study also did not address the consequences for firms that, *accused of illegality,* resolved their cases through guilty or nolo contendere pleas, settlements, and so on. Cohen (1991) described most firms involved in illegal activities from 1984 through 1990 as resolving their cases through guilty pleas; only 12 percent of the firms he studied were convicted of corporate illegality. We focused on the smaller group, since our interest concerned whether convictions related negatively to firms' longer-term performance, but we encourage researchers to examine the performance implications of other events, such as guilty pleas, and compare them against our results for convictions.

We could not assess the impact of the new, stricter sentencing guidelines for corporate offenders adopted by the U.S. Sentencing Commission in 1991. We designed our study to test longer-term conviction-performance relationships revealed in data on the period prior to the imposition of the new guidelines, allowing us to compare our results with those of prior research. The Sentencing Commission estimated that under the new guidelines, criminal fines would increase two- to fourfold, but Cohen (1992) argued firms would receive penalties 5.5 to 11 times higher than prior levels. Our study represents a conservative test of conviction-performance links, and we expect the new guidelines to strengthen those relationships.

Implications

Corporate managers should broaden their interpretation of the consequences of corporate illegality and go beyond court-imposed penalties and

immediate declines in stock price to consider the reactions of other stakeholders. Managers, such as those at Food Lion, may dismiss fines and slight declines in stock price as inconsequential (Salwen & Ruffenach, 1993), but our results show convicted firms also experience lower sales growth from the third through the fifth post-conviction year and earn lower returns (ROA and ROS) over the five years following conviction. Repeated convictions accentuate negative conviction-performance relationships, raising the stakes for the managers of offending firms.

Investors may also insufficiently grasp the implications of a conviction. Our results show no longer-term relationship between stockholders' returns and conviction for illegal activities, with the exception of product liability with punitive damages. Studies of events such as disclosure of wrongdoing, conviction, and the announcement of penalties, however, have established an immediate change in stock price. Investors seem to respond only over short periods—one day to two weeks—thereafter discounting illegal activities as past managerial mistakes. Stock prices reflect stockholders' expectations for the future, but they do not seem to fully incorporate firms' longer-term prospects for reduced financial returns and slower sales growth.

We believe penalties for illegality, including lower financial performance, do not prevent subsequent violations in part because managers do not receive clear, direct feedback on the magnitude of penalties for wrongdoing. Illegality has a prolonged or delayed impact (e.g., reduced sales growth) on firms' financial performance, so managers may not experience immediate feedback comparable to feeling the burn of a hot stove. Then too, managers, lawmakers, regulators, and others interested in preventing and deterring wrongdoing should consider that illegality may represent an institutional failure and thus, the penalties associated with a conviction may not deter subsequent violations. Cultures, control and reward mechanisms, staffing decisions, and so forth combine to produce illegal activities and poor financial performance. Sanctions and monetary penalties likely have little impact, since they do little to alter corporate culture; courts should focus on changing management, requiring codes of ethics, and engaging in other activities as part of a compliance program for altering a firm's culture and preventing repeated wrongdoing.

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STRATEGIC CHANGE: THE INFLUENCE OF MANAGERIAL CHARACTERISTICS AND ORGANIZATIONAL GROWTH

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This study examined how chief executive and top management team characteristics interact with organizational performance to influence strategic change. Results indicate that poor performance, long chief executive and top management team tenures, and high diversity in top management team tenure are associated with greater levels of strategic change. In addition, poor performance moderated the relationship between managerial characteristics and strategic change, increasing the likelihood of the latter.

The past decade of organizational research has moved from an investigation of organizational statics to an investigation of organizational dynamics, much of it focused on organizational change and its antecedents (Fligstein, 1991; Hannan & Freeman, 1989). Strategy and organizational researchers seem to vary in the extent to which they adopt an adaptive or inertial view of strategic change, although the two perspectives can be viewed as poles on a continuum (Gersick, 1994). Those who argue for the predominance of strategic adaptation emphasize the role that managers play in monitoring environmental changes and modifying organizational strategy to better match environmental contingencies (Child, 1972). Theorists adopting a more inertial view of strategy argue that organizations are constrained in their ability to adapt, and that it is the general tendency for strategy to be preserved rather than radically changed (Hannan & Freeman, 1989). Political resistance and vested interests within an organization can also encourage inertia and make change difficult (Tushman & Romanelli, 1985).

Researchers have argued that executive change, in particular, change in a company's chief executive and top management team, is an important mechanism for overcoming inertia and political resistance (Ocasio, 1993). As Tushman and Romanelli noted, "Only executive leadership has the position and potential to initiate and implement strategic change" (1985: 209). As top management structures remain stable, they become more insulated over time, and chief executives and top managers are less likely than they may have been to deviate from earlier courses of action, especially when change involves organizational strategy (Goodstein & Boeker, 1991). In ad-

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dition to the characteristics of chief executives and top management teams, conditions of poor performance make it easier to overcome resistance to organizational and strategic change (Haveman, 1993; March & Simon 1958). The performance of an organization is one of the clearest indicators of the viability of its strategy and an important predictor of whether it will change the markets it competes in (Zajac & Kraatz, 1993). Poor performance signals top management that the existing manner of operating is inappropriate and that strategic and organizational changes may be necessary (Boeker & Goodstein, 1991).

This study examined the dynamics of change in corporate strategy, which refers to decisions about the products and markets firms compete in. Past research has typically not empirically examined strategic change as a function of the combined effects of organizational performance and managerial characteristics. As depicted in Figure 1, the primary purpose of this study was to explore an integrated model of strategic change that takes into account the direct and interactive effects of performance and chief executive and top management characteristics on change in corporate strategy—that is, in the range of products a firm competes in. More importantly, I argue that managerial characteristics interact with organizational performance to create a context through which product-market change becomes particularly likely. The hypotheses generated by this model were tested on a set of 67 semiconductor firms over a 14-year period.

FIGURE 1
Top-Level Managerial Characteristics, Firm Performance, and Corporate Strategic Change
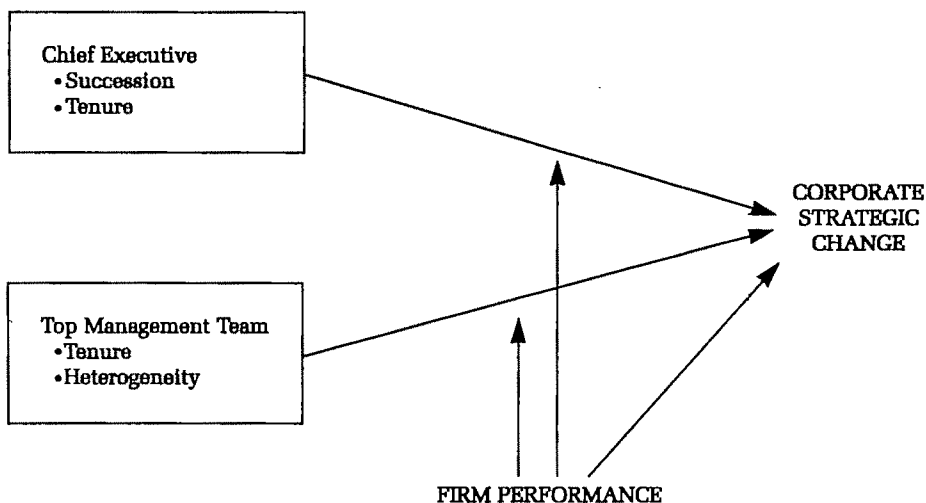
THEORY

The Role of Performance

Past research has shown that poor performance acts as a catalyst to organizational change when managers take actions in response to a decline in performance (Cyert & March, 1963; Kiesler & Sproull, 1982). March and Simon (1958) were among the first to argue that poor performance will lead organizations into problem-motivated search, which in turn will lead to pressures for change. Only when poor performance signals that an existing manner of operating is inappropriate do managers attempt to change an organization to respond to environmental change (Tushman & Romanelli, 1985).

Managers of organizations that are performing poorly are in a position to more easily overcome resistance to change and may be able to use poor organizational performance to legitimate changes that may be politically difficult otherwise (Finkelstein & Hambrick, 1996). In a classic example, Chandler (1962) described how strategic changes emerged in response to poor performance at Standard Oil, DuPont, and General Motors. At an individual level, prospect theorists (Kahneman & Tversky, 1979) have also argued that, under conditions of adversity, failure to meet performance targets will lead to increased change and risk seeking (Bromiley, 1991).

If poor performance may lead to organizational change, good performance may lead to inertia. As long as performance is above a threshold level, organizations will have a tendency to persist in repertoires and routines established earlier (Nelson & Winter 1982). Hannan and Freeman (1984) argued that organizational success exacerbates inertia, and thus resistance to organizational changes. Organizational success can also make top managers feel that they can safely ignore external change (Dutton & Duncan, 1987). As Oster noted "As long as performance is satisfactory, firms will continue to allocate internal resources using whatever rules of thumb they've used in the past" (1982: 377). Organizations that have recently been successful will resist changes in their basic strategies and missions. The longer such firms have been successful, the greater the extent to which resistance to change and inertia will prevail (Boeker & Goodstein, 1991), and the less likely it will be that changes in external conditions will lead directly and immediately to change (Tushman & Romanelli, 1985).

> *Hypothesis 1: Organizations performing poorly will exhibit greater strategic change than successful organizations.*

Chief Executive Characteristics

Chief executive succession. In past theoretical and empirical work on strategic change, organizational leaders have been viewed as the motivating force behind changes in the products or markets an organization competes in

(Ginsberg, 1988; Virany, Tushman, & Romanelli, 1992). Because its chief executive plays an important role in helping define the strategy of an organization, change in the chief executive carries with it the likelihood that changes will be made in the organization's strategy (Ocasio, 1993). Work by Helmich and Brown (1972) demonstrated an association between chief executive succession and organizational change, confirming that greater organizational change accompanied chief executive change. Empirical examinations of the effects of executive succession on organizational and strategic change have stressed the important role played by executive succession in overcoming inertia and initiating changes in the strategy of an organization (Brady & Helmich, 1984).

When chief executive succession occurs, a new individual, with new skills and perspectives—including new ideas on the range of markets in which a firm should compete—takes charge of an organization. Since succession often implies change in the way in which a firm operates, it carries with it the likelihood that prevailing norms and expectations within the organization will be upset. In a classic case, Gouldner (1954) examined how a successor made substantive changes in an organization's products, strategy, and manner of operating, which in turn disrupted the firm's existing strategy and internal power structure. The process of chief executive succession provides an opportunity for existing power relationships to be altered, for new strategic perspectives to be introduced, and for strategic change to take place.

> *Hypothesis 2a: Organizations in which chief executive*
> *succession has occurred will exhibit greater strategic*
> *change than those in which no succession has occurred.*

The effects of poor performance (Hypothesis 1) and chief executive succession (Hypothesis 2a) on strategic change may be complementary and mutually reinforcing. Poorly performing organizations experiencing a chief executive succession may be more likely to change strategy than poor performers that do not change their chief executive.[1] Under conditions of poor performance, the mandate for a new chief executive may require specific changes in the strategy of the organization. The effects of poor performance may interact with chief executive change, leading to a greater degree of strategic change when an organization simultaneously experiences both a chief executive change and poor performance.

> *Hypothesis 2b: Poorly performing organizations in which*
> *chief executive succession occurs will exhibit greater stra-*

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[1] Of course, firm performance may itself have an effect on executive succession. However, past studies have indicated that the strength of the relationship between performance and succession is modest (Fredrickson, Hambrick, & Baumrin, 1988). I consider the issue of causality in the discussion section.

tegic change than successful organizations with a chief executive succession.

Chief executive tenure. Chief executive successions are relatively rare events (James & Soref, 1981). Even if no succession event occurs, the length of time a chief executive has been in the job (his or her job tenure) may have an important effect on the likelihood that he or she will initiate a change in strategy. Hambrick and Finkelstein (1996) noted that researchers investigating executive tenure have consistently argued that long-tenured chief executives are less likely to make changes in their organizations.

Theorists also have posited that tenure in an organization affects an executive's cognitions. The longer the tenure of an individual, the more rigid his or her cognitive structures and the less likely he or she is to promote or champion change. Organizational tenure is thought to be associated with rigidity and commitment to established policies and practices (Katz, 1982) and may also restrict information processing through the establishment of routines and repertoires for dealing with problems and issues (Miller & Friesen, 1984). In an empirical study, Hambrick, Geletkanycz, and Fredrickson (1993) found that long-tenured executives were significantly more committed to the status quo than executives with shorter tenure. Additional evidence that executive tenure reduces strategic change was provided by Finkelstein and Hambrick (1990), who found that the company tenure of top executives was highly positively related to the absence of strategic change. Similarly, Grimm and Smith (1991) found that the tenure of top executives in the railroad industry was inversely related to the degree to which their firms changed strategies after deregulation.

Past behaviors, precedents, and repertoires increasingly constrain and determine the actions that a chief executive will take (Nelson & Winter, 1982). For example, Miller (1991) found that firms with long-tenured chief executives were less likely to have strategies and structures appropriate to their environmental requirements. Over time it becomes increasingly difficult to break old behavioral and cognitive patterns, particularly with regard to the strategy of an organization. Organizations with longer-tenured chief executives are less likely to initiate changes in strategy.

> *Hypothesis 3a: Organizations with longer-tenured chief executives will exhibit less strategic change than those with shorter-tenured chief executives.*

As in the case of chief executive succession, the effects of performance may interact with chief executive tenure. Organizations with shorter-tenured chief executives may generally be more likely to change strategy, but this effect is expected to be stronger when the performance of the firms has been poor. Conversely, successful organizations with longer-tenured chief executives may be less likely to change strategy.

> *Hypothesis 3b: Poorly performing organizations with*

> *longer-tenured chief executives will exhibit greater strate-*
> *gic change than successful organizations.*

Top Management Team Characteristics

Although the chief executive's role in strategic change is critical, the other members of a firm's top management team also have an important influence on strategic choices. In their upper echelons approach, Hambrick and Mason (1984) emphasized that strategic decisions are associated with characteristics of the top managers in an organization. Wiersema and Bantel (1992) further demonstrated how top management characteristics, such as tenure and tenure diversity, influence the likelihood of strategic change.

Top management tenure. Finkelstein and Hambrick (1996) noted that the organizational tenure of top managers has received the most extensive theoretical and empirical attention of all top management demographic characteristics. Top management groups with long organizational tenure are expected to have great social cohesion, lessening the likelihood that individual members of a team will challenge the status quo (Michel & Hambrick, 1992). Long tenure provides a better understanding of organizational policies and procedures and a reluctance to change past ways of operating (Hambrick & Mason, 1984).

Empirical work supports the argument that lengthy top management tenure lowers the likelihood of organizational and strategic change. Katz (1982) demonstrated that organizational tenure was associated with increased commitment by top managers to their organizations' established policies and practices. Similarly, Bantel and Jackson (1989) showed that teams with longer organizational tenures exhibited a greater commitment to the status quo and to the culture and norms of their organizations. In an extensive study of 100 computer, chemical, and natural gas distribution firms between 1978 and 1982, Finkelstein and Hambrick (1990) found a negative relationship between top management organizational tenure and strategic change. Finally, Wiersema and Bantel (1992) found that shorter average top management tenure led to changes in corporate strategy within a sample of *Fortune* 500 companies.

> *Hypothesis 4a: Organizations with longer-tenured top*
> *management teams will exhibit less strategic change than*
> *organizations with shorter-tenured top management*
> *teams.*

As with my predictions regarding chief executive effects on strategic change, I would expect that the influence of top management team characteristics, such as tenure, would be moderated by the performance of an organization. Combining the effects of performance and team tenure,

> *Hypothesis 4b: Poorly performing organizations with*
> *longer-tenured top management teams will exhibit greater*
> *strategic change than successful organizations.*

Top management tenure diversity. It is not only the absolute level of a top management team's tenure, but also the homogeneity of the tenure distribution that leads to a propensity to maintain the status quo (Wiersema & Bantel, 1992). Group-level homogeneity on demographic traits leads to perceptions of similarity with and attraction to others (Pfeffer, 1983). Conversely, top management teams with diverse tenure distributions will be composed of individuals likely to have different attitudes toward an organization and its strategy because of their tenure-stage differences (Katz, 1982). Demographic heterogeneity is associated with cognitive heterogeneity, both of which increase the number of strategic alternatives considered by a top management team and the evaluation of those alternatives (Finkelstein & Hambrick, 1996).

Differences in cognitive structures will create more diverse information collection, interpretation, and solution generation among top management team members, which, in turn, will contribute to a greater impetus for organizational and strategic change (Dutton & Duncan, 1987). Wiersema and Bantel (1992) argued that top management teams that were heterogeneous would also be more creative and more likely to rely on a broader set of information sources and perspectives when making strategic decisions than more homogeneous top management teams. As a result, heterogeneous teams will be more open to change than homogeneous teams. Heterogeneity in tenure increases the chance that a top management team will break with past patterns and practices and will attempt to reconfigure an organization's strategy (Wiersema & Bantel, 1992). Thus, tenure heterogeneity within a top management team should lead to diverse opinions and be associated with changes in strategy.

> *Hypothesis 5a: Organizations with homogeneous top management tenure distributions will exhibit less strategic change than firms with heterogeneous top management tenure distributions.*

Like the effects of the other managerial variables on strategic change, the effects of tenure diversity should be moderated by performance.

> *Hypothesis 5b: Poorly performing organizations with homogeneous top management tenure distributions will exhibit less strategic change than successful organizations.*

METHODS

The hypotheses were tested on 67 semiconductor producers located in the Santa Clara–San Jose area of California (Silicon Valley) over a 14-year period, 1978–92. I chose to study a single industry to control for potentially confounding interindustry effects, especially on my dependent variable, strategic change. I chose the semiconductor industry for study because of the depth and comprehensiveness of longitudinal data available on these firms, particularly for the variables of interest in the study: strategic change and chief executive and top management team characteristics.

Following the approach used by Eisenhardt and Schoonhoven (1990), I defined a semiconductor producer as an organization founded exclusively to develop, produce, and sell semiconductor devices on the merchant market. Of the 67 firms, 43 were publicly traded; the remainder were privately held at the end of the study. Data on these firms were available from (1) three of the four largest market research firms serving the semiconductor industry,[2] personal interviews with top managers of each organization (typically including the president or chief executive officer), and (3) information from articles in the electronics and business press as well as public documents.

Model Specification

The data were analyzed using a pooled time series and cross-sectional data structure. To correct for autocorrelation and heteroscedasticity, I used Kmenta's (1986) autoregressive-heteroscedastic model, which employs a two-stage generalized-least-squares method to iteratively correct first for autocorrelation and then for heteroscedasticity.

Measures

Strategic change. The dependent variable of interest in the study was strategic change. A distinction is made in the strategy literature between business and corporate strategy. Strategy at the business level constitutes decisions regarding the basis of competition within a specific business (how to compete). Strategy at the corporate level pertains to decisions on a firm's mix of businesses (what to compete in).

For this study, I was interested in assessing the corporate strategy question within the context of the semiconductor industry. Using data from the market research firms, I identified 20 specific segments that comprised the product-markets within the semiconductor industry. Other studies in the semiconductor industry (e.g., Eisenhardt & Schoonhoven, 1990) have used the same categories, which are listed in the Appendix.

Strategic change was operationally defined as the absolute percentage of annual change in degree of diversification across the 20 product-markets and measured using the Jacquemin and Berry (1979) entropy measure of diversification. This measure of corporate strategy captures the extent of diversity across a firm's products. It is calculated as follows: Let P_i be the percentage of total firm sales in the *i*th business and let n be the number of a firm's businesses. Then

$$entropy = \sum P_i \ln(1/P_i).$$

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[2] The fourth firm did not monitor information on managerial characteristics for the semiconductor firms and was, therefore, unable to provide information for the study.

Changes in strategy were measured by taking the absolute percentage of change in a firm's entropy measure each year, represented in this study as the period t to $t + 1$.

Independent Variables

Performance. Performance was measured as industry-adjusted average growth for two years: the year prior to one in which strategic change was measured and the year a strategic change was measured. For example, for a strategic change occurring in the period 1989–90, performance would be measured as industry-adjusted average growth for the two years 1988–90. Because firm strategy was first measured in 1978, firm growth was first measured in 1977. I used two-year average growth because organizations may not ordinarily react to poor performance by making important organizational changes (such as changes in strategy) in the same year that poor performance occurs (Virany et al., 1992).

Because many semiconductor firms and their owners (who are often venture capitalists) frequently do not expect to realize positive returns for the first several years of their operations, financial performance may be misleading for firms in this industry (Dataquest, 1984; Eisenhardt & Schoonhoven, 1990). Even better-established firms have historically been willing to accept years of marginal or negative returns in order to increase sales. Therefore, I measured performance for a given two-year period by comparing average firm growth (measured as two-year revenue growth) to average revenue growth for the semiconductor industry for the same two years. Other performance indexes (such as profitability or stock market performance) would also have been useful, but this information was not available from a large number of the firms sampled for the entire period under investigation, especially those that were privately held.

Chief executive characteristics. Chief executive tenure was measured as the number of year a firm's current chief executive had held the job at time t. Chief executive succession was measured from $t - 1$ to t and was dummy-coded as 1 when a succession event occurred.

Top management team characteristics. I defined top management team members as those individuals reporting directly to a firm's chief executive and calculated the organizational tenure of each top manager using biographical data available from the market companies and the firms themselves. Team tenure was measured by taking the average of the aggregate tenure of all top managers.

Top management tenure diversity was measured using the coefficient of variation, defined as the standard deviation divided by the mean. Wiersema and Bantel (1992), following Allison (1978), noted that the coefficient of variation, because it is a scale-invariant measure, is preferred to the standard deviation or variance for interval-level variables. Following Wiersema and Bantel (1992), I took the logarithm of the heterogeneity measure to capture the decreasing rate of the effect of dissimilarity of team tenure on strategic

change. To measure top management team homogeneity, the heterogeneity measure was reverse-coded.

Control Variables

Environment. The level of environmental munificence affects the flow of resources into an organization, making it easier for firms to expand their product mixes (Hannan & Carroll 1992). Munificence, which signals changes in the carrying capacity of an environment, is most often indicated by changes in industry sales (Dess & Beard, 1984). Hannan and Freeman (1989) argued that successful performance provides opportunities for organizations to accumulate slack and diversify. Environmental munificence was operationally defined as inflation-adjusted changes in overall semiconductor industry sales.

Size. There are two competing theories regarding the effect of firm size on strategic change. According to the first, firms change more easily when they are small and tend to change less easily as they grow larger, more bureaucratic, and more inertial (Hannan & Freeman, 1989). The alternative argument focuses on larger firms' control of extensive resources, claiming that when more resources are controlled it is easier to initiate and sustain change (Haveman, 1993). Given these contradictory arguments, I made no hypothesis about the effect of firm size on strategic change, but included size, measured as the logarithm of firm sales, as a control.

Firm age. Most literature on strategic and organizational change seems to argue that older firms should be more inert than younger firms (Hannan & Freeman, 1989). As firms age, numbers of routines, programs, and structures increase and become more internally consistent. Precedent gradually dictates an increasing portion of organizational action (Cyert & March, 1963). Others argue, however, that young firms, suffering from potential liabilities of newness, are less willing to make changes that might disrupt already tenuous links with suppliers, customers, and other stakeholders. Given the uncertainty of the relationship between age and strategic change, I included it as a control.

Time. This study spans 14 years. Over that period, there might have been variation in the level of strategic change undertaken by firms in general. For example, the semiconductor industry might have become more highly developed over the period of the study, with firms becoming less likely to change their strategies over time. Given possible temporal variation in strategic change, I included time as a control in the model.

Public or private ownership. Publicly held organizations may operate differently than privately held organizations with respect to strategic change. One might expect, a priori, that publicly owned firms will be generally less inert and therefore, more likely to change strategies. I included this measure to control for possible differences between firms that were publicly traded, and thus possibly more open to outside investor influence in decisions regarding strategic change, and those that were privately held. Public ownership was coded as 1, private ownership as 0.

TABLE 1
Descriptive Statistics[a]

Variables	Means	Standard Deviations	1	2	3	4	5	6	7	8	9	10
1. Strategic change	0.26	0.63										
2. Performance	0.14	0.10	-.34									
3. Chief executive succession	0.22	0.51	.23	-.13								
4. Chief executive tenure	4.55	8.31	-.16	-.15	-.68							
5. Top management team tenure	6.83	11.21	-.16	-.13	-.07	.12						
6. Top management team heterogeneity	0.63	0.31	.21	.04	.03	-.04	-.19					
7. Environmental munificence	0.13	0.10	.20	.03	-.11	.06	.10	-.13				
8. Firm size	3.36	1.67	.04	.09	-.02	.03	.07	.05	-.09			
9. Firm age	14.31	8.69	-.11	.10	-.04	.04	.06	.04	-.11	.23		
10. Time	7.0	4.67	.08	-.09	.06	.02	.01	.04	-.05	.17	.63	
11. Public ownership	0.61	0.34	.19	.14	.13	-.09	-.03	.03	-.03	.21	.17	.11

[a] All correlations above $r = .18$ are significant at $p < .05$.

RESULTS

Table 1 shows means, standard deviation, and correlations among the variables for all years of data pooled. In Table 2, I present the effects of the variables on strategic change in two models. The first model includes only the control variables; the second model adds the direct effects of performance, chief executive characteristics, and top management characteristics, and it also includes the interactions between organizational performance and managerial characteristics.

The five control variables were entered in the first model of Table 2. They explained 11 percent of the variance in strategic change. The main and interactive effects of the variables were entered in model 2 of Table 2. Hypothesis 1 predicts that performance will exhibit a negative relationship with strategic change. In addition, I argued that top management characteristics such as chief executive succession (Hypothesis 2a), chief executive tenure (Hypothesis 3a), top management team tenure (Hypothesis 4a), and top management tenure diversity (Hypothesis 5a) will influence strategic change. Results shown under model 2 of Table 2 indicate that the effects of performance and of three of the four main effects are significant. Performance, chief executive tenure, top management team tenure, and tenure homogeneity all had a negative relationship with strategic change. There was no significant relationship between chief executive succession and strategic change. The final set of hypotheses examined the interactive effects of performance and managerial characteristics. Hypothesis 2b predicts that poor performance will interact with chief executive succession to affect strategic

TABLE 2
Results of Regression Analyses for Strategic Change[a]

Variables	Model 1	Model 2	ΔR^2
Performance		−.26**	.05
CEO		.07	.00
CEO tenure		−.20**	.04
Top management team tenure		−.12*	.02
Top management team homogeneity		−.15*	.03
Performance × CEO succession		.08	.00
Performance × CEO tenure		−.22**	.04
Performance × top management team tenure		−.19*	.03
Performance × top management team heterogeneity		−.17*	.03
Environmental munificence	.13	.12	
Firm size	.21*	.19*	
Firm age	−.04	−.03	
Time	.08	.07	
Public ownership	.17*	.15*	
Adjusted R^2	.11	.36	

[a] Standardized coefficients are reported. $N = 67$ firms over 14 years.
* $p < .05$
** $p < .01$

change. However, the results for model 2 of Table 2 indicate that the inter-action term was not significant.

Hypothesis 3b tested the interaction effects of performance and chief executive tenure, predicting that successful organizations with longer-tenured chief executives will exhibit less strategic change. As can be seen in model 2 of Table 2, this hypothesis is supported. To investigate this inter-action effect in more detail, I examined the partial differentiation of strategic change with respect to chief executive tenure to estimate the effect of the interaction of that variable and performance on strategic change:

$$\delta(strategic\ change)/\delta(CEO\ tenure) = -.20 - 22(performance). \quad (1)$$

From the above equation, the value of $\delta(strategic\ change)/\delta(CEO\ tenure)$ is 0 when *performance* = −.91. Since all independent variables were stan-dardized prior to the regression analysis, this finding indicates that chief executive tenure decreases the likelihood of strategic change unless perfor-mance is less than .91 standard deviations below its mean. The results sup-port the prediction of an interactive effect between chief executive tenure and performance on strategic change: as performance increases, the relation-ship between chief executive tenure and strategic change grows increasingly negative.

In regard to the interactive effects of performance with top management tenure and top management tenure diversity, in Hypothesis 4b I predicted a negative interactive effect of performance and top management tenure on strategic change. Successful organizations with long-tenured teams may be particularly reluctant to change strategy, a finding supported in model 2 of Table 2. Taking the partial derivative of strategic change with respect to top management team (TMT) tenure:

$$\delta(strategic\ change)/\delta(TMT\ tenure) = -.12 - 19(performance). \quad (2)$$

The value of $\delta(strategic\ change)/\delta(TMT\ tenure)$ is 0 when *performance* is −.63 standard deviations below the mean, indicating that top management team tenure decreases the likelihood of strategic change unless performance is less than .63 standard deviations below its mean. The results support the prediction of an interactive effect between TMT tenure and performance on strategic change: as performance increases, the relationship between TMT tenure and strategic change grows increasingly negative.

Similarly, Hypothesis 5b investigates the interactive effect of perfor-mance and top management tenure diversity, predicting that successful firms with homogenous teams will be less likely to change strategy. Taking the partial derivative of strategic change with respect to top management team homogeneity:

$$\delta(strategic\ change)/\delta(TMT\ homogeneity) = -.15 - 17(performance). \quad (3)$$

The value of $\delta(strategic\ change)/\delta(TMT\ homogeneity)$ is 0 when *performance* is −.88, indicating that TMT tenure homogeneity decreases the likelihood of

strategic change unless performance is less than .88 standard deviations below its mean.

Examination of the control variables reveals that firm size and public ownership both had positive effects on the extent of strategic change in all the models. Larger firms in the sample were more likely to initiate strategic change, supporting the argument that when an organization controls extensive resources, it is easier for it to initiate and implement strategic change. In addition, public ownership was associated with greater strategic change. Possibly, the greater availability of funding and resources generally commanded by publicly held companies made the initiation of strategic change easier. An important extension of this research might be to look at the interplay of ownership, performance, and strategic change in more detail. In the present study, ownership is included as a control, but ownership itself could also moderate the relationship between growth and change in strategy. Neither environmental munificence, firm age, nor time had a significant effect on strategic change in either of the models.

DISCUSSION

I began by noting that past research has not empirically examined strategic change as a function of the combined effects of organizational performance and managerial characteristics. The primary purpose of this study was to explore an integrated model of strategic change that took into account the direct and interactive effects of performance with chief executive and top management characteristics. New evidence about the extent to which organizations change their mix of businesses in response to both declines in performance and characteristics of their chief executives and top managers emerged from the results.

This study first examined the relationship between firm performance and strategic change. Since the top management of a firm initiates strategic change, I also explored the combined effects of four managerial characteristics on strategic change: (1) chief executive succession, (2) chief executive tenure, (3) top management tenure, and (4) top management tenure diversity. Finally, since poor organizational performance might make the effects of managerial characteristics on strategic change more pronounced, I examined the interactive effects of performance and the four managerial characteristics.

Three sets of findings emerged from the results. First, the results indicate that conditions of poor organizational performance make strategic change more likely. As others have argued (e.g., Kiesler & Sproull, 1982), performance declines signal management that the existing strategy of an organization may not meet the requirements of the environment, necessitating a change in strategy. Second, this research supports the view that top managers have an important independent influence on the directions of firms through their decisions regarding strategy (Hambrick, 1993). I investigated the effects of chief executive characteristics on strategic change, find-

ing that chief executive tenure had a significant effect on strategic change, whereas chief executive succession did not. The results for top management characteristics indicated that both the tenure of the top management team and the degree of homogeneity in the tenure of top managers were also important predictors of strategic change. Accordingly, it is not only the *average* level of team tenure but also the *diversity* of team tenure that affects the degree of change in strategy. Previous research has examined links between a top management team and a firm's strategy (e.g., Wiersema & Bantel, 1992) but has not focused on the combined role of the chief executive and the top management of an organization in influencing strategic change.

Third, and perhaps most importantly, I examined the combined effects of performance and chief executive and top manager characteristics to develop a more fully specified model. Past empirical researchers have generally overlooked the conditions under which change and adaptation are likely, particularly the potential role of performance as a moderator of change. The results indicated an interactive relationship between performance and top management characteristics affecting strategic change. Although managerial characteristics may themselves cause organizations to change strategy, poor performance increases their motivation to do so. I found support for the moderating role of performance in tests of three of the four hypotheses that specified a performance interaction. The findings point to the opportunity poor performance provides for initiating change in strategy. Poor performance is an important indication of misalignment between an organization's strategy and its environment, and it signals managers that change in strategy may be necessary.

This research also suggests a number of areas of future study. The underlying causal assumption of this study is that changes in performance and managerial characteristics lead to changes in strategy. It is probably also likely that changes in strategy lead to changes in the types of top managers selected and may also have an effect on the performance of a firm. Changes in firm strategy often disrupt existing ways of doing business and involve shifts to new bases of power in a firm, both of which have significant ramifications for the functioning of its top management team. It would be interesting to examine the effects of strategic changes on managerial characteristics looking at, for example, the effect of strategic change on change in the top management team or the choice of a chief executive successor. Research that more closely examines the detailed longitudinal process of strategic change and the roles of performance and top management as both influencing and being influenced by strategic change is needed.

An important limitation of this study was its focus on a single industry; it is critically important for future research to examine the phenomenon of strategic change in other settings. In addition, this setting involves firms all located in essentially the same area (Silicon Valley), further limiting the generalizability of the findings. I chose the semiconductor industry specifically because of the depth and comprehensiveness of the longitudinal data available, especially the information on strategic and managerial change.

Despite its limitations, the industry was an attractive venue for this study, given its relatively recent history, the rapid rate of management and organizational change, and the availability of detailed data on strategic changes across specific product-markets. Other industries, especially more mature industries, may not exhibit the same degree of strategic and managerial change.

A final limitation is the use of organizational growth as a measure of firm performance. In the semiconductor industry, accounting-based return measures (e.g., profits or return or investment) may be misleading because owners (particularly venture capitalists) frequently do not anticipate any profits until a firm has been operating for a number of years. Although revenue growth has been argued to be the superior measure of performance for these firms, more mature firms may have a greater focus on performance measures such as returns or cash flow. Thus, the focus of this study on performance as growth may not be as broadly applicable.

A potential area of concern is the possibility for collinearity among the independent variables, especially the relationship between performance and chief executive and top management team changes. Of the zero-order correlations in Table 1, the greatest correlation among chief executive or top management characteristics and performance is .15. The correlations between performance and other managerial characteristics are smaller and do not seem to pose a serious problem in this study.

The chief executive and top managers of an organization are important links between an organization's performance and strategic change. Studying the issue of how change in strategy takes place can provide important insights into the interaction between organizational performance and the role of top management (the chief executive and top management team) in limiting or encouraging strategic change, especially in the face of declining organizational performance. Future research into strategic change must continue to investigate the primary question of who controls the strategic change process. This study is an initial step in investigating changes in the strategy of an organization over time as they relate to the combined effects of the performance and top management of a firm. Much more research is needed to fully understand motivations for changes in strategy and the dynamic interplay between top management, firm growth, and strategic change.

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APPENDIX

Semiconductor Industry Markets Studied[a]

Digital gate arrays
Analog gate arrays
Standard cells
Programmable logic devices
Silicon compliers
DRAM
SCRAM
ROM
EPROM
EEPROM
FERRAM
Optoelectronic components
Power field effect transistors
Other discrete
Linear
Digital gallium arsenide
Analog gallium arsenide
Microprocessors
Microperipherals
Standard logic

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[a] Sources: Dataquest (1984), Eisenhardt and Schoonhoven (1990).

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TECHNICAL AND STRATEGIC HUMAN RESOURCE MANAGEMENT EFFECTIVENESS AS DETERMINANTS OF FIRM PERFORMANCE

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We evaluated the impact of human resource (HR) managers' capabilities on HR management effectiveness and the latter's impact on corporate financial performance. For 293 U.S. firms, effectiveness was associated with capabilities and attributes of HR staff. We also found relationships between HR management effectiveness and productivity, cash
flow, and market value. Findings were consistent across market and
accounting measures of performance and with corrections for biases.

There is broad agreement that a strategic approach to human resource management (HRM) involves designing and implementing a set of internally consistent policies and practices that ensure a firm's human capital (employees' collective knowledge, skills, and abilities) contributes to the achievement of its business objectives (Baird & Meshoulam, 1988; Jackson & Schuler, 1995; Schuler & Jackson, 1987). Fundamental to the strategic HRM perspective is an assumption that firm performance is influenced by the set of HRM practices firms have in place. Recent empirical evidence supports this basic assumption (Arthur, 1994; Cutcher-Gershenfeld, 1991; Huselid, 1995; Huselid & Becker, 1996; MacDuffie, 1995).

Paradoxically, the preliminary empirical research, which established a relationship between HRM policies and practices and firm performance, made little distinction between policies and practices that reflect the more traditional, or technical, personnel perspective and those that reflect the adoption of the strategic human resource management perspective. Moreover, prior work has not considered the types of capabilities of human resources staffs associated with the effective implementation of these two types of HRM policies and practices.

In this article, we attempt to improve upon the prior empirical literature on this topic by focusing on the impact of overall HRM quality on firm performance. We first develop the argument that HRM effectiveness, which

includes the delivery of high-quality technical and strategic HRM activities, will be reflected in valued firm-level outcomes. We then assert that two types of HRM staff capabilities will have a significant impact on the effective management of firms' human capital. To study the impact of HRM effectiveness and human resources staff capabilities on valued firm-level outcomes—employee productivity and corporate financial performance—we examined a large sample of firms drawn from a wide range of industries. Finally, we consider two important methodological issues that could bias our results: (1) the potential endogeneity of firm profitability and managerial assessments of HRM effectiveness and (2) survey response bias.

THEORETICAL BACKGROUND AND HYPOTHESES

Technical and Strategic HRM Effectiveness

Institutional theorists view organizations as entities that seek approval for their activities in socially constructed environments. Conformity to expectations for behavior is the means through which firms gain legitimacy and acceptance in the eyes of stakeholders. Consequently, over long periods of time, HRM activities of interest to these stakeholders spread throughout the population of firms. External stakeholders whose expectations are particularly relevant in shaping technical HRM activities include the government, which regulates a wide range of employment practices, and various professional organizations (Baron, Jennings, & Dobbin, 1988; Tolbert & Zucker, 1983). The expectations of these stakeholders tend to be similar for all firms, and all firms feel some pressure to conform. In addition, key internal stakeholders (line managers and executives) prefer high-quality technical HRM activities (Tsui, 1987). Technical HRM activities that have been increasingly regulated through stakeholder expectations include recruiting, selection, performance measurement, training, and the administration of compensation and benefits. Reflecting the high level of knowledge and expertise associated with these activities are occupational specializations for those who carry out these activities, professional criteria for judging the effectiveness of these activities, and professional certification programs for those who carry them out (Baron et al., 1988).

In contract to technical HRM activities, strategic HRM activities are relatively recent innovations, so stakeholders are not yet likely to hold strong expectations or put pressure on organizations to adopt these practices (cf. Johns, 1993; Wright & McMahan, 1992). Although scholars have yet to reach agreement about how best to define strategic human resource management, there is, nevertheless, broad agreement that it involves designing and implementing a set of internally consistent policies and practices that ensure a firm's human capital contributes to the achievement of its business objectives (Baird & Meshoulam, 1988; Jackson & Schuler, 1995; Schuler & Mac-Millan, 1984). During the past decade, compensation systems in particular have been studied as a way to deploy HRM systems strategically (Gerhart &

Milkovich, 1992; Gomez-Mejia & Balkin, 1992). The strategic role of a firm's HRM system has become the focus of empirical investigation somewhat more recently (Jackson & Schuler, 1995). Other strategic HRM activities include team-based job designs, flexible workforces, quality improvement practices, employee empowerment, studies designed to diagnose a firm's strategic needs, and planned development of the talent required to implement competitive strategy and achieve operational goals. For these strategic HRM activities, there is little shared understanding about how to achieve effective implementation, and there are few regulatory guidelines; in addition, occupational specialization is not yet apparent. Given these conditions, effective strategic HRM activities should be relatively rare across a population of firms. Thus,

> *Hypothesis 1: U.S. firms have achieved higher levels of technical human resource management effectiveness than of strategic HRM effectiveness.*

HRM Effectiveness and Firm Performance

The resource-based view of the firm suggests that a firm's pool of human capital can be "leveraged" to provide a source of competitive advantage (cf. Barney, 1991; Wright, McMahan, & McWilliams, 1992). Assuming heterogeneity among firms with respect to their human capital, competitive advantage is possible if a firm insures that its people add value to its production processes and that its pool of human capital is a unique resource, both difficult to replicate and difficult to substitute for. HRM practices comprise the many activities through which firms create human capital that meets these conditions. Specifically, firms can use technical HRM activities to select high-ability employees, whose talent is rare by definition (cf. Wright & McMahan, 1992), and to train employees so they have the unique skills needed. Strategic HRM activities, on the other hand, help a firm to ensure that its human resources are not easily imitated. Because of the social complexity and causal ambiguity inherent in strategic HRM practices such as team-based designs, empowerment, and the development of talent for the long term, competitors can neither easily copy these practices nor readily replicate the unique pool of human capital that such practices help to create. These arguments suggest

> *Hypothesis 2: In U.S. firms, both strategic and technical human resource management effectiveness will be positively associated with firm performance.*

Capabilities That Enhance HRM Effectiveness

An obvious extension of this line of inquiry concerns the issue of *how* organizations can maximize HRM effectiveness. That is, how can firms increase the probability that they will adopt and then effectively implement appropriate HRM practices? Insuring that members of the HRM function

have the appropriate capabilities (or competencies) has been suggested as one way to increase the likelihood of effective HRM (Lawler, 1992; Ulrich & Lake, 1990). Specifically, two types of HRM staff capabilities have been identified as important: professional HRM capabilities and business-related capabilities.

Historically, the presumption of the field was that *professional HRM capabilities* related to the delivery of traditional technical HRM practices were both necessary and sufficient for assuring the development and effective implementation of HRM practices. As the strategic HRM paradigm emerged, this assumption was called into question by those who argued that, although professional HRM capabilities may be necessary to ensure technical HRM effectiveness, they are not sufficient; *business-related capabilities* were required also (e.g., Schuler, 1992; Walker, 1992). Presumably, business-related capabilities enable members of a human resources staff to understand how business considerations unique to a firm can create firm-specific HRM needs. This logic suggests

> *Hypothesis 3: Human resources staffs in U.S. firms will have achieved higher levels of professional capabilities than of business-related capabilities.*

> *Hypothesis 4: Technical human resource management effectiveness will be associated with professional human resources capabilities, and strategic HRM effectiveness will be associated with both professional and business-related capabilities.*

METHODS

Sample

Respondents were senior executives in human resource management (92%) and line (8%) positions. Because there were no significant differences in the effectiveness or capabilities ratings provided by the line and HR managers, our analyses combine the two subgroups. These survey responses were matched with publicly available financial data for the 293 publicly held U.S. firms that participated in the study. Financial data were obtained for the years 1991 (contemporaneous measures, used as control variables) and 1992 (prospective measures, used as the outcomes to be predicted).

Measures

Based on an extensive review of the literature, the survey instrument included items that assessed HRM effectiveness across a wide range of practices (23 items) and items that assessed the capabilities of a firm's human resource staff's members (18 items; cf. Towers-Perrin, 1992). We explored the dimensionality of these 41 items, treated as a single set, using principal

components factor analysis with oblique rotation.[1] As Table 1 shows, these analyses indicated that the constructs of strategic HRM effectiveness, technical HRM effectiveness, business-related capabilities, and HRM professional capabilities could be represented in four factors. Items with factor loadings of .40 or greater on only one factor, shown in bold in Table 1, were retained and used to construct the indexes described below.

HRM effectiveness. The 23 relevant items asked respondents to indicate how satisfied they were with "the results currently being achieved" using a scale ranging from 1 (highly satisfied) to 5 (very dissatisfied). Responses were reverse-coded, so higher values indicate higher perceived effectiveness. The two dimensions of HRM effectiveness shown in Table 1 were labeled *strategic HRM effectiveness* (factor 2, Cronbach's $\alpha = .75$ for 8 items) and *technical HRM effectiveness* (factor 3, Cronbach's $\alpha = .66$ for 8 items). Strategic HRM effectiveness describes perceptions of how well the HRM function developed a firm's employees to support its business needs, including facilitating teamwork, communications, and involvement, enhancing quality, and developing talent to serve the business in the future. Technical HRM effectiveness describes perceptions of how well the HRM function performed activities traditionally associated with personnel management, including recruitment, selection, training, performance appraisal, and compensation administration.[2]

HRM capabilities scales. The 18 relevant items in the survey asked respondents to "indicate the extent to which HRM staff currently possess the capabilities and attributes listed" using a scale ranging from 1 (applies to most) to 5 (applies to very few). Responses were coded in such a way that higher values indicated higher levels of perceived capability. The two dimensions of HRM capabilities, shown in Table 1, were labeled *professional HRM capabilities* and *business-related capabilities*. Professional HRM capabilities (factor 1, Cronbach's $\alpha = .85$ for 11 items) describe expertise and skill relevant to performing excellently within a traditional HRM functional

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[1] Nearly identical results were obtained when confirmatory factor analyses were conducted. Each standardized factor loading generated by these analyses was significantly different from zero, and alternative analyses using a variety of specifications did not yield a model with significantly better fit. The results shown are also nearly identical to results obtained when effectiveness items and capabilities items were analyzed separately. Interested readers can obtain a full description of these analyses by contacting the first author.

[2] A disadvantage of these measures is that they cannot differentiate between the presence of operationally appropriate HRM practices and the quality of their implementation. In addition, our questionnaire did not define effectiveness for respondents, and the measures do not explicitly address differences in how various constituencies might evaluate HRM effectiveness (cf. Tsui, 1987). Thus, our measures to some degree depend on managerial expectations of what an appropriate level of HRM effectiveness represents. However, if managerial assessments were related to HRM effectiveness in such a way that managers in more effective firms had *higher* standards (perhaps because of their greater skills or better information), then our findings would provide *underestimates* of the impact of HRM effectiveness on firm performance.

TABLE 1
Principal Components Factor Structure of the Human Resource Management Items[a]

Item	Factor 1	Factor 2	Factor 3	Factor 4	Alpha
Professional HRM capabilities					.85
Anticipates the effect of internal and external changes	**.73**	.18	−.07	.10	
Exhibits leadership for the function and corporation	**.71**	.16	.08	.10	
Demonstrates the financial impact of all HR activities	**.71**	.11	.05	.00	
Defines and communicates HR vision for the future	**.67**	.20	.01	.01	
Educates and influences line managers on HR issues	**.64**	.18	.10	.18	
Takes appropriate risks to accomplish objectives	**.63**	.25	.05	.11	
Broad knowledge of many HR functions	**.61**	.21	−.06	−.01	
Knowledgeable about competitors' HR practices	**.56**	−.06	.13	−.04	
Focuses on the quality of HR services	**.48**	.20	.16	.06	
International experience	**.43**	.00	−.08	.06	
Influences peers in other companies	**.43**	.03	.23	.06	
Significant external customer contact	.36	.01	.18	.16	
Foreign language capability	.28	−.01	−.02	.09	
Computer literacy	.26	−.02	.16	.06	
Highly specialized knowledge of a few HR functions	−.06	−.23	.22	.09	
Strategic HRM effectiveness					.75
Teamwork	.14	**.70**	.08	−.10	
Employee participation and empowerment	.18	**.70**	−.02	−.13	
Workforce planning—flexibility and deployment	.11	**.60**	.05	.13	
Workforce productivity and quality of output	.21	**.57**	.07	−.05	
Management and executive development	.08	**.55**	.19	.23	
Succession and development planning for managers	.00	**.51**	.18	.26	
Advance issue identification/strategic studies	.02	**.45**	.04	.35	
Employee and manager communications	.13	**.45**	.23	−.01	
Work/family programs[b]	.08	.03	.22	.49	
Technical HRM effectiveness					.66
Benefits and services	.02	.07	**.60**	−.10	
Compensation	.05	.16	**.57**	−.21	
Recruiting and training	.04	.01	**.55**	−.02	
Safety and health	.03	−.04	**.48**	.10	
Employee education and training	.06	.37	**.46**	.28	
Retirement strategies	.11	.05	**.45**	.18	
Employee/industrial relations	.25	.07	**.43**	−.36	
Social responsibility programs	.09	.08	**.43**	.39	
EEO for females, minorities, etc.	.04	.08	.35	.26	
Management of labor costs	.12	.24	.35	−.20	
Selection testing	−.05	.14	.28	.01	
Performance appraisal	.02	.24	.27	−.02	
Human resource information systems	.18	.09	.26	−.02	
Assessing employee attitudes	.09	.22	.18	.05	
Business-related capabilities					
Experience in other key business areas	.34	.13	.02	**.62**	.61
Line management experience	.30	.04	−.03	**.55**	
HR-career-oriented	−.02	.01	.15	**−.49**	
Eigenvalue	6.60	2.76	2.02	1.93	
Proportion of variance accounted for	16.10	6.80	4.90	4.70	

[a] $N = 293$. Bold type indicates an item was included in the index.

[b] This item was not included in any index, despite meeting our .40 criteria for inclusion. We excluded this item because its content was not logically appropriate for inclusion in the business-related capabilities index.

department. Items assess both capabilities important to managers in any function and capabilities that specifically insure that technical HR knowledge is both present and used within a firm. Business-related capabilities (factor 4, Cronbach's α = .61 for 3 items) describe the amount of business experience HRM staff members have had outside the functional specialty. These capabilities should facilitate the selection and implementation of HRM policies and practices that fit the unique characteristics of a firm, including its size, strategy, structure, and culture (Jackson & Schuler, 1995). The negative loading for the item "HR-career-oriented" confirms that a business orientation is viewed as being quite distinct from that typical of HR managers.

Firm performance. The three indicators of firm performance used in this study were based on data taken from annual financial statements obtained primarily from the database Compact Disclosure. We retrieved data missing from this source from *Moody's Industrial Manual* or *Standard & Poor's Corporation Records.* Information concerning share prices was obtained from the *Investment Statistics Laboratory Daily Stock Price Record* and the *Standard & Poor's Stock Price Guide.* All performance data were matched to the same accounting period. Performance measures for the period July 1, 1991, through June 30, 1992, are labeled "1991" and are contemporaneous with the collection of survey data, and data reflecting the period July 1, 1992, through June 30, 1993, are labeled "1992" and are prospective vis-à-vis the survey.

Our definition of *employee productivity* as the logarithm of net sales per employee was consistent with prior empirical work (Huselid, 1995). This measure tends to reflect employee efforts that are somewhat insulated from variations in the capital and product markets. Net sales per employee is an incomplete measure of firm performance, however, as it does not reflect overall firm profitability. Therefore, drawing from the literatures in accounting and financial economics (Hall, Cummins, Laderman, & Mundy, 1988; Hirsch, 1991; Hirschey & Wichern, 1984), we selected two standard measures to capture profitability: *gross rate of return on assets* (GRATE) and Tobin's *q.* GRATE is an accounting-based profitability indicator, whereas Tobin's *q* is a market-based one. Accounting-based profitability indicators are subject to numerous biases not present in market-based measures, which are generally considered to be more accurate reflections of a firm's financial health. However, accounting measures of firm profits provide information not contained in market-based measures (Hirschey & Wichern, 1984). We calculated the gross rate of return on assets (GRATE), which reflects short-term (annual) profitability, by dividing cash flow by gross capital stock (Hall et al., 1988; Hirsch, 1991). GRATE is superior to more traditional measures of accounting profits (return on assets or equity) in that it is less sensitive to depreciation and other noncash transactions (Hall et al., 1988). We calculated Tobin's *q,* which is a future-oriented and risk-adjusted capital-market measure of performance that reflects both current and anticipated profitability, by dividing the market's valuation of a firm's assets by their current replacement cost (Hall et al., 1988; Hirsch, 1991). Conceptually, *q* is a mea-

sure of the value added by management, as it reflects the premium the capital market will pay for a given portfolio of assets.[3]

Control Measures

Recent reviews of the literature (cf. Huselid, 1995; Jackson & Schuler, 1995) suggest that a variety of conditions in the external and internal organizational environments influence both HRM activities and firm performance; these conditions represent sources of potential extraneous variance. To reduce the possibility of spurious results caused by correlations among these variables and our constructs of interest, we included the following control measures in our statistical analyses (all control measures reflect 1991 conditions): union coverage, firm size, capital intensity, industry concentration, sales growth, R&D expenditures, stock price variability (beta), and firm industry. Union coverage (the percentage of a firm's employees belonging to a union) was reported by respondents. All other control measures were created from publicly available information, as follows: As an indicator of firm size, we used the logarithm of total employment. Capital intensity was calculated as the logarithm of the value of property, plant, and equipment divided by total employment. We calculated industry concentration by dividing sales from the relevant industry's largest four firms by the total sales for that industry. Sales growth and R&D expenditures (which were normalized by sales) were calculated directly from the accounting data. We calculated beta, the systematic component in the variability of a firm's stock price, for a period of 250 trading days (one year) using the Center for Research on Stock Prices (CRSP) database. To control for industry, we created nine dummy codes (not listed in the tables). Finally, some analyses included 1991 firm performance as a control measure (see below).

ANALYSES AND RESULTS

Descriptive Statistics

Table 2 shows means, standard deviations, and zero-order correlations. The zero-order correlations among the four human resource management measures were positive and statistically significant ($p < .05$), yet sufficiently low to indicate that different constructs were assessed. Similarly, correlations among the measures of firm performance were positive and generally significant, yet sufficiently low to indicate that consideration of each dependent variable was warranted.

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[3] Our calculations for both q and GRATE were taken from Hall and colleagues (1988) and Hirsch (1991), who outlined corrections to accounting data to serve as proxies for replacement costs. Because there were missing data, we were unable to complete all of the adjustments to firm capital structure those authors recommended. However, we were able to estimate the sensitivity of the results to each of the missing variables by substituting values for these variables across all reasonable ranges into our calculations for q. The analyses indicated that the missing variables did not materially affect our estimates of q.

The firms in this study represented manufacturing (36%), financial services (14%), utilities (8%), and miscellaneous service industries (42%). The average total employment was 28,650 (the logarithm of this variable was used in all subsequent analyses), and firm-level unionization averaged 20.55 percent. These values are larger than those generally reported as the average for U.S. firms because large firms were overrepresented in this study.

Hypothesis 1

As predicted, respondents described their firms' technical HRM activities as more effective than their firms' strategic HRM activities ($\bar{x} = 3.36$ vs. 2.79; paired-$t_{292} = 16.55$, $p < .01$). These findings are consistent with the argument that large firms in the United States are more proficient in their technical HRM capabilities than in their strategic HRM capabilities. Thus, as time goes on, a ceiling effect may begin to constrain the ability of U.S. firms to gain competitive advantage through continued improvements in technical HRM activities.

Hypothesis 2

Hypothesis 2 predicts that technical and strategic HRM effectiveness will be positively associated with firm performance. Table 3 shows the results of the regression analyses used to test this hypothesis. For each of the three performance outcomes, two equations are shown. In the first equation for each prospective (1992) performance outcome (models 1, 3, and 5), we included all control variables except contemporaneous (1991) firm performance when estimating the effects of the two facets of HRM effectiveness. The second equation shown for each outcome measure includes controls for contemporaneous firm performance (models 2, 4, and 6). For models 1, 3, and 5, a clear pattern of results emerged: strategic HRM effectiveness was significantly associated with firm performance, but technical HRM effectiveness was not associated with firm performance.

The assumption implicit in models 1, 3, and 5 is that the observed HRM effectiveness–firm performance results portray an equilibrium relationship, so that most of the impact of current levels of effectiveness will be reflected in a current or prospective year's financial performance. However, it is also possible that some portion of current levels of HRM effectiveness are the result of recent actions not yet reflected in firm performance. We don't know how much of each firm's HRM effectiveness is the result of such recent actions, but it is reasonable to expect higher *levels* of HRM effectiveness in a given year to be positively related to an *increase* in performance the following year. An estimate of the magnitude of such an implementation-to-benefit lag can be calculated by adding contemporaneous (1991) measures of firm performance to models 1, 3, and 5, which produces models 2, 4, and 6. With one exception (model 6), the coefficients for strategic HRM effectiveness were all positive and significant ($p < .05$) or marginally significant ($p < .10$). Conversely, with one exception (again, model 6), the coefficients for technical HRM effectiveness were nonsignificant ($p > .10$). Given the

TABLE 2
Means, Standard Deviations, and Correlations for All Variables[a]

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
HRM effectiveness																		
1. Strategic HRM	2.79	0.58																
2. Technical HRM	3.36	0.48	.35															
HRM capabilities																		
3. Professional HRM capabilities	2.98	0.65	.41	.25														
4. Business-related capabilities	2.09	0.71	.23	.08	.30													
Dependent and control variables																		
5. Employee productivity, 1991	12.17	0.84	.03	.07	.02	.00												
6. Employee productivity, 1992	12.12	0.66	.08	.02	-.04	.01	.75											
7. Gross rate of return, 1991	0.07	0.14	.08	.13	.00	.09	.15	.14										
8. Gross rate of return, 1992	0.09	0.14	.13	.09	-.01	.09	.10	.10	.70									
9. Tobin's *q*, 1991	0.51	1.07	.16	-.05	.10	.08	.05	.10	.40	.47								
10. Tobin's *q*, 1992	0.61	1.10	.10	-.01	.12	.09	.07	.11	.33	.48	.79							
11. Total employment[b]	28,650.51	62,188.05	.06	.01	-.02	-.07	-.08	-.10	.02	.11	-.04	-.10						
12. Capital intensity	4.35	1.27	.02	.10	-.07	-.01	.38	.42	.01	-.12	-.36	-.36	-.01					
13. Union coverage	20.55	24.25	-.03	.05	-.15	.13	.00	.01	-.08	-.14	-.35	-.35	.15	.29				
14. Concentration ratio	0.38	0.10	-.02	-.02	.05	.02	.00	.04	-.06	-.08	-.05	.00	.07	.12	.07			
15. Sales growth	0.66	0.66	.06	.03	-.02	.10	.08	.09	.05	.05	.09	.10	.02	.07	-.01	.01		
16. R&D intensity	0.02	0.04	-.03	-.12	.01	-.12	-.06	-.05	.01	-.07	.12	.08	-.10	.02	-.23	-.04	.09	
17. Systematic risk	1.08	0.18	-.12	-.10	.01	-.12	-.03	-.04	-.05	-.03	-.02	.01	-.13	-.17	-.16	.06	-.05	.14

[a] All correlations greater than or equal to .10 are significant at the .05 level; $r \geq .13$ are significant at the .01 level; and $r \geq .16$ significant at the .001 level; all two-tailed tests.

[b] The raw mean of total employment is reported here to ease interpretation. The logarithm of this variable is used in all subsequent analyses.

TABLE 3
Results of Regression Analyses for Firm Performance[a]

Variables	1992 Productivity Model 1	1992 Productivity Model 2	1992 GRATE Model 3	1992 GRATE Model 4	1992 Tobin's q Model 5	1992 Tobin's q Model 6
Constant	11.426*** (0.556)	4.002*** (0.629)	-0.159*** (0.134)	-0.089 (0.097)	1.710*** (0.871)	-0.314 (0.549)
Control variables						
Total employment[b]	-0.008 (0.021)	0.051*** (0.016)	0.006 (0.005)	0.008** (0.004)	-0.039 (0.034)	-0.021 (0.021)
Capital intensity	0.199*** (0.033)	-0.093*** (0.031)	-0.011† (0.008)	-0.008† (0.006)	-0.208*** (0.053)	-0.001 (0.034)
Union coverage	-0.001 (0.002)	0.000 (0.001)	-0.001* (0.000)	-0.001† (0.000)	-0.009*** (0.003)	-0.003* (0.002)
Concentration ratio	0.203 (0.334)	0.450 (0.245)	-0.049 (0.081)	-0.014 (0.058)	0.823† (0.528)	0.251 (0.325)
Sales growth	0.045 (0.051)	0.008 (0.037)	0.003 (0.012)	-0.001 (0.009)	0.135* (0.080)	0.061 (0.049)
R&D/sales	-0.067 (0.963)	0.857 (0.707)	-0.083 (0.233)	-0.147 (0.168)	1.613 (1.520)	-0.627 (0.941)
Beta	0.169 (0.194)	-0.023 (0.142)	0.003 (0.047)	0.024 (0.034)	-0.411† (0.306)	0.146 (0.190)
Contemporaneous firm performance		0.657*** (0.042)		0.666*** (0.042)		0.835*** (0.039)
HRM effectiveness						
Strategic HRM	0.104* (0.062)	0.059† (0.046)	0.022† (0.015)	0.018* (0.011)	0.183* (0.094)	-0.066 (0.062)
Technical HRM	-0.093 (0.076)	-0.057 (0.055)	0.006 (0.018)	-0.013 (0.013)	-0.004 (0.108)	0.103† (0.074)
R^2	0.328	0.642	0.166	0.566	0.290	0.733
Adjusted R^2	0.286	0.618	0.115	0.537	0.248	0.715
F	7.888***	27.244***	3.230***	19.844***	6.598***	41.722***
N	293	293	293	293	293	293

[a] $N = 293$. Standard errors are in parentheses. All models include nine dummy variables reflecting ten 1-digit Standard Industrial Classification controls (not shown).

[b] Value is a logarithm.

† $p < .10$, one-tailed test
* $p < .05$, one-tailed test
** $p < .01$, one-tailed test
*** $p < .001$, one-tailed test

extreme degree of multicollinearity created by the inclusion of 1991 firm performance as a control, the results of these highly restrictive specifications can be interpreted as providing additional confirmatory evidence of the impact of HRM effectiveness on firm performance.

In analyses not shown, we used Hausman's (1978) test to evaluate the impact of simultaneity and selectivity biases. In essence, the Hausman test is a two-stage procedure that begins by generating predicted values (instrumental variables) for both dimensions of the HRM effectiveness scales, which are then included in an ordinary-least-squares (OLS) regression equation for each dependent variable. A significant coefficient on the predicted value for either or both facets of HRM effectiveness would indicate that they were endogenous in the equation and thus provide evidence of simultaneity bias (Hausman, 1978). We found no such evidence, leading us to focus on the single-equation OLS regression results presented in Table 3.

Selectivity bias and a nonrandom sampling procedure are also potential sources of error. If the firms included in this study differed in systematic ways from those not included, and if the control variables included in the model did not capture those differences, the models could be misspecified. To correct for selectivity bias, we used Heckman's (1979) procedure. It begins by regressing a "probit response" model on the variables included in the system. The procedure then generates an inverse Mills's ratio, which is included as a control in subsequent models. The selectivity bias indicators were mostly nonsignificant. More importantly, the magnitude and significance of the result were essentially the same as those reported in Table 3. In fact, the corrections generally strengthen the result, and in no case was the net effect of human resource management effectiveness found to be negative. Thus, we concluded that our results supported Hypothesis 2.

Hypotheses 3 and 4

As Hypothesis 3 predicts, respondents described the professional HRM capabilities of their firms' HRM staff members as greater than their business-related capabilities ($\bar{x} = 2.98$ vs. 2.09; paired-$t_{292} = 18.84$, $p < .01$). Thus, Hypothesis 3 was supported.

To evaluate Hypothesis 4, we regressed technical and strategic HRM effectiveness on each facet of HRM capabilities, including the relevant control variables in the equations, as is shown in Table 4. Consistent with our expectations, professional HRM capabilities were positively and significantly associated with technical HRM effectiveness (see model 7), and both technical capabilities ($p < .05$) and business-related capabilities ($p < .10$) were associated with strategic HRM effectiveness (see model 8).

Practical Consequences of HRM Effectiveness

As did Cohen (1994) and Schmidt (1996), we suggest that in an applied domain such as human resource management, it is useful for scholars to move beyond conventional tests of statistical significance and express their results in terms of practical significance. Thus, we evaluated the practical

TABLE 4
Results of Regression Analyses for Human Resource Management Effectiveness[a]

Variables	Technical HRM Model 7	Strategic HRM Model 8
Constant	2.565***	1.485***
	(0.395)	(0.444)
Control variables		
Total employment[b]	−0.005	0.028†
	(0.018)	(0.021)
Capital intensity	0.033	−0.012
	(0.029)	(0.033)
Union coverage	0.001	−0.001
	(0.001)	(0.001)
Concentration ratio	−0.117	−0.009
	(0.264)	(0.297)
Sales growth	0.020	0.029
	(0.036)	(0.047)
R&D/sales	−1.278*	−0.414
	(0.780)	(0.879)
Beta	−0.198†	−0.141
	(0.153)	(0.172)
HRM capabilities		
Professional HRM capabilities	0.198***	0.335***
	(0.045)	(0.050)
Business-related capabilities	−0.027	0.060†
	(0.042)	(0.047)
R^2	0.122	0.198
Adjusted R^2	0.070	0.150
F	2.325**	4.133***
N	293	293

[a] $N = 293$. Standard errors are in parentheses. All models include nine dummy variables reflecting ten 1-digit Standard Industrial Classification controls (not shown).
[b] Value is a logarithm.
† $p < .10$, one-tailed test
* $p < .05$, one-tailed test
** $p < .01$, one-tailed test
*** $p < .001$, one-tailed test

impact of HRM effectiveness by calculating the consequence of a one-standard-deviation increase in HRM effectiveness on the numerator of each dependent variable. For productivity, our estimates were scaled in dollars per employee per year. For the gross rate of return on assets (GRATE), our estimates reflect the consequences for cash flow per employee per year. For Tobin's q, the unit of interest is the change in market value per employee. For all of these practical estimates, the figures presented are adjusted to reflect the mean performance of firms in the sample, so these estimates indicate the value of the average percentage increase in performance per employee per year. Finally, we note that the estimates derived from GRATE and Tobin's q have the attractive feature of being net of any additional costs

that such an increase in HRM effectiveness might generate. For the gross rate of return on assets, this is so because investments in HRM systems are generally expensed annually, and Tobin's q reflects the present value of a firm's future cash flows, which by construction are also net of relevant expenses.

On a per employee, present value basis, a one-standard-deviation increase in overall HRM effectiveness corresponds to an estimated increase in sales per employee of 5.2 percent, valued at $44,380 (95% confidence interval [C.I.]: −$8,242 to $100,787). The impact of a one-standard-deviation increase in HRM effectiveness on profits yielded an estimated increase in cash flow of 16.3 percent, valued at $9,673 per employee (95% C.I.: −$3,517 to $22,863). To calculate this estimate, we presumed an 8 percent discount rate over a five-year period. Finally, a one-standard-deviation increase in HRM effectiveness yielded an estimated increase in market value of 6 percent, valued at $8,882 per employee (95% C.I.: $3,726 to $14,611), which again is very similar to the estimated present value of the cash flows. Taken as a whole, these estimates illustrate the impact of effective human resource management on three widely followed measures of firm performance. Moreover, the consistency in the magnitude of these estimates is notable, given the modest correlations among the three performance measures.

DISCUSSION

For a sample of U.S. firms drawn from a wide range of industries, our evidence suggests that, in 1991, the levels of technical human resource management effectiveness they had achieved were higher than their levels of strategic HRM effectiveness. The average level of perceived technical HRM effectiveness was approximately one standard deviation higher than the average level of perceived strategic HRM effectiveness. Furthermore, perceived strategic and technical HRM effectiveness were only modestly correlated (r = .35). These results suggest the extent to which technical HRM activities have become institutionalized. Institutionalized activities, we argued, are inadequate as a means of differentiating from competitors and thus are not powerful tools for gaining competitive advantage. Today and in the near future, therefore, the potential gains to be made by large U.S. firms through increased HRM effectiveness may be greater to the extent firms focus on making improvements within the domain of strategic HRM activities.

This conclusion may not generalize, however, to smaller U.S. firms and to firms competing in environments characterized by lower levels of institutionalization for technical HRM activities, such as large firms in other countries and global firms whose human resource practices have been shaped by the institutional environment of another country. If in these contexts technical HRM effectiveness is low among competitors, improvements in this domain may be a means to gain competitive advantage. Furthermore, if firms in such contexts have not yet achieved at least moderate levels of

technical HRM effectiveness, they may not have the foundation needed to successfully implement strategic HRM activities.

The significant relationships between strategic HRM effectiveness and employee productivity, cash flow, and market value we found are consistent with institutional theory and the resource-based view of the firm. We found no meaningful relationships between technical HRM effectiveness and firm performance, however. These findings, which were consistent across capital-market and accounting-based measures of firm performance, were sufficiently robust to be revealed after we made several corrections for simultaneity and selectivity biases. That the greatest potential gains are through improved effectiveness in the domain in which firms in general are currently least proficient represents a significant opportunity for continuing gains in worker productivity and firm performance.

One important threat to the validity of our results requires further elaboration. Our statistical models rely on the assumption that HRM effectiveness affects firm performance, yet other causal models are also possible. The one-year lag between predictor and outcome measures does not exclude the possibility of a simultaneous relationship between HRM effectiveness and firm performance. Thus, one alternative explanation for the positive relationships found between strategic human resource management effectiveness and firm performance are retrospective attributions that bias respondents' perceptions of such effectiveness. Knowing she works in a firm that is performing well, for example, a manager may conclude that the firm's strategic HRM effectiveness is high. For several reasons, we believe this is an unlikely explanation for the results shown in Table 3. First, if retrospective attributions were at work, it is not obvious that they would bias perceptions of strategic HRM effectiveness in favor of our hypothesis but not have a similar effect on perceptions of technical HRM effectiveness. Second, the pattern of results was fairly consistent for the three different measures of firm performance, although the correlations among these variables were only moderate. Third, our results were similar for current and prospective years' financial performance. Fourth, the results of Hausman tests did not indicate the presence of significant simultaneity.

For practicing managers, evidence supporting the assertion that strategic human resource management effectiveness enhances firm performance may help bolster arguments intended to procure the resources needed to implement strategic HRM systems. Alone, however, such evidence offers little guidance about the resources that are most useful. Concerning the human resources needed to implement strategic HRM systems, our results suggest that professional HRM capabilities and, to a lesser extent, business-related capabilities increase the effectiveness of strategic HRM activities. Two important implications follow. First, professional skills and abilities of human resources staff members appear to support the implementation of strategic HRM activities and should be retained even by firms undergoing a paradigm shift in their approach to human resource management. Second, business-related capabilities appear to be important contributors to strategic

HRM activities, and their development among HRM professionals should be encouraged.

Combined with evidence from recent studies linking HRM activities and firm performance (Arthur, 1994; Cutcher-Gershenfeld, 1991; Huselid, 1995; Huselid & Becker, 1996; MacDuffie, 1995), our results support the decade-old argument that investments in human resources are a potential source of competitive advantage. Nevertheless, scholars have very little understanding of the processes required to realize this potential, or the specific conditions under which the potential is realized. These issues are important for future work to address.

In addition, the modest levels of internal consistency reliability in our measures also represents a challenge for future work on this topic. A potential solution to the data collection challenges described herein is to collect longitudinal or panel data on both firm HRM practices and corporate financial performance and to have multiple raters, perhaps each favoring a different constituency, rate the performance of the human resource function along multiple dimensions (Tsui, 1987). But as has been described elsewhere (Huselid & Becker, 1996), such data are not a panacea, as use of longitudinal data compounds the problems associated with measurement error. Such an approach would, however, allow scholars to develop econometric and psychometric corrections for the biases described here, and also to develop plausible estimates of the impact of HRM systems.

Researchers should also consider the potentially divergent preferences of multiple constituencies in future studies of HRM effectiveness. Human resource management effectiveness is a very broad construct that, conceptually, should reflect diverse needs and desires. Managerial estimates of HRM effectiveness are likely to reflect averaged views of primary stakeholders. To the degree there are diverging interests among the key constituencies of a human resource department, our estimates understate the impact of HRM effectiveness on firm financial performance (the focus of the current study), or any other objective measure of performance that is specific to the interests of a single constituency, such as shareholders.

Another important extension of this work would be to consider potential costs and benefits of technical and strategic HRM to constituencies other than shareholders. For example, the success of firms that employ effective HRM activities should enable them to pay employees higher wages, provide more training and promotion opportunities, and lay off fewer people during economic downturns (Weitzman & Kruse, 1990). Assuming firms act in these ways, effective HRM yields benefits for both individual employees and the broader economic and social system. Conversely, if firms choose not to take advantage of the opportunities for such mutual gains, exploited employees may ultimately pay for the financial successes attained through strategic human resource management (cf. Kochan & Osterman, 1994). The challenge for future work is to develop both grounded theory and practical guidance for practitioners, who can then develop HRM systems that capture the potential gains for all concerned.

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RETROSPECTIVE REPORTS IN ORGANIZATIONAL RESEARCH: A REEXAMINATION OF RECENT EVIDENCE

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Retrospective reports of important organizational phenomena are commonly used in strategic management and organization theory research. A recent study, however, suggested that these reports tend to be inaccurate and seriously questioned their use. Our reexamination of this study suggests the situation is not so dire. Our work suggests that retrospective reporting is a viable research methodology *if* the measure used to generate the reports is adequately reliable and valid. Retrospective reports should neither be rejected nor used indiscriminately.

Retrospective reports are popular tools for learning about the past. Such reports are used in courtroom proceedings, journalistic interviews, congressional hearings, and many other investigatory endeavors. In organizational research, retrospective reports have been used extensively in studies of decision making (e.g., Bourgeois & Eisenhardt, 1988; Mintzberg, Raisinghani, & Theoret, 1976), organizational change (e.g., Huber & Glick, 1993; Kanter, 1983), and competitive strategies (e.g., Feeser & Willard, 1990; Zajac & Shortell, 1989).

Despite the popularity of retrospective reports, many researchers believe that problems associated with informant fallibility strongly influence these reports. The primary problem is that key informants may not be able to accurately recall the past. As Golden (1992), Huber and Power (1985), Wolfe and Jackson (1987), and many others have suggested, inaccurate recall in retrospective reporting can result from inappropriate rationalizations, oversimplifications, faulty post hoc attributions, and simple lapses of memory. A secondary problem is that key informants may try to present a socially de-

sirable image of themselves or their firms (Golden, 1992; Huber & Power, 1985).

In the strategic management and organization theory areas, the sources of retrospective reports are typically chief executive officers. In some studies (e.g., Bourgeois & Eisenhardt, 1988), retrospective data from chief executives are combined with data from other upper-echelon executives, but in many studies (e.g., Zajac & Shortell, 1989) only chief executives provide retrospective data. Thus, understanding the degree of inaccuracy that tends to exist in chief executive retrospective reports is critical.

In a recent empirical study, Golden (1992) examined chief executive accuracy and reported that only 42 percent of chief executives accurately selected the competitive strategies their firms were using two years prior to the retrospective reports. In Golden's words, "Nearly 60% of the retrospective reports . . . did not agree with the validated reports elicited only two years earlier" (1992: 852). Golden's study is important because it is the only study that systematically examines the issue of retrospective accuracy using a large sample of chief executives. Further, despite Golden's warning to treat his conclusions as tentative, the study has been cited a substantial number of times by authors arguing that retrospective reports are dangerous and should be avoided or treated with extreme caution. Priem and Harrison, for example, cited Golden to support the conclusion that retrospective reports suffer from "severe problems of recollection" (1994: 318). Priem and Harrison subsequently dropped retrospective reports from their review of methodologies for eliciting strategic information. In another example, Kumar, Stern, and Anderson cited Golden to support the position that informant reports and actual events may exhibit "little correspondence" (1993: 1634). We view Golden (1992) as a seminal study that has helped to define the key territory for the discussion of retrospective accuracy.

The purpose of this brief research note is to reexamine the evidence supporting Golden's conclusion that "use of retrospective accounts in management research needs to be seriously questioned" (1992: 857). Given the persistent popularity of retrospective reports and given the importance of Golden's study, we considered it important to reexamine his evidence. Our reexamination focused on three methodological issues: (1) the use of an overly pessimistic statistic to assess accuracy, (2) the use of a fairly weak questionnaire measure, and (3) the failure to separate error due to unreliability of that measure from error due to informant fallibility. After taking into account these three issues, our reanalysis of the Golden data suggests that error due to informant fallibility was not excessive, but error due to the measure used in generating the retrospective reports was excessive. Thus, our reanalysis suggests that retrospective reporting is a viable research methodology if the measure used to generate reports is adequately reliable and valid.

We make two contributions in this note. First, we provide evidence that the only major study of CEO retrospective accuracy yielded overly pessimistic results. Second, we reduce the likelihood that Golden's (1992) pessimis-

tic results will be used as a basis for indiscriminate rejection of retrospective reports. We argue, however, against the use of our more optimistic results as a basis for indiscriminate acceptance of retrospective reports. Evidence of validity and reliability should be reported routinely for any measurement approach, including retrospective reporting.

ASSESSMENT OF ACCURACY

The first methodological issue concerns the use of percentage of agreement (percent agreement) as an indicator of accuracy. Golden (1992) reported the percentage of chief executives who selected the same strategy in a nonretrospective report in 1984 and in a retrospective report in 1986. Unfortunately, percent agreement has two major shortcomings as an indicator of accuracy. First, it does not adjust for chance agreement (Cohen, 1960). Thus, it is sensitive to the number of coding categories used. Second, and most important, it corresponds to the sum of joint probabilities that indicate whether an organization is placed into the same category at time 1 and time 2. The real issue, however, is the probability of an organization's being placed into an appropriate category at time 2. Because of the focus on joint probabilities, percent agreement ordinarily understates the actual probability of appropriate time 2 classifications. A simple example illustrates the problem. Assume that a classification procedure for a three-category classification project has a .8 probability of placing an organization into the appropriate category. Random error prevents the probability from being 1.0. If the procedure is applied twice in a simple test-retest study, the probability of placing an organization into the appropriate category at time 1 is .8, and the probability at time 2 is .8, but the probability of placing an organization into the appropriate category at *both* time 1 *and* time 2 is .64 (.8 × .8). Similarly, the probability of placing an organization into either of the two inappropriate categories might be .1. Then, the probability of placing the organization into the first inappropriate category at *both* time 1 *and* time 2 is .01 (.1 × .1), and the probability of placing an organization into the second inappropriate category at *both* time 1 *and* time 2 is .01 (.1 × .1). Percent agreement for a sample of organizations would be on average .66 (.64 + .01 + .01), but the probability of appropriate time 2 classification is .8.

An Appropriate Statistic

Although percent agreement is inappropriate as an accuracy statistic, other indices have been proposed and are very useful when dealing with the type of categorical data used by Golden (1992). Because accuracy can be framed in terms of reliability or validity and because different indices have been proposed for these two approaches, we had to make a choice between reliability and validity (cf. Brennan & Prediger, 1981).

Intertemporal reliability concerns the extent to which a chief executive places his or her organization in the same category when nonretrospectively choosing a category at time 1 and when retrospectively choosing a time 1

category at time 2. Neither the category chosen at time 1 nor the category chosen at time 2 is assumed to be the true category: a chief executive selecting the wrong category at time 1 and then picking the same category at time 2 would contribute positively to intertemporal reliability.[1] Retrospective validity, however, concerns the extent to which a chief executive places his or her organization in the true time 1 category when assessing time 1 at time 2. To obtain high retrospective validity, the true time 1 category must be chosen at time 2; to obtain high intertemporal reliability, the same category selected at time 1 must be selected at time 2. In each case an appropriate category must be chosen at time 2, but the definition of appropriateness differs.

To assess intertemporal reliability for retrospective classifications, a researcher must know the time 1 classifications made by raters. Importantly, if the overall measurement procedure used to classify organizations into categories is not more valid at time 2 than at time 1 (and it usually is not), then intertemporal reliability sets the upper bound for retrospective validity. Thus, intertemporal reliability can typically be viewed as an indirect indicator of retrospective validity.

To assess retrospective validity, a researcher must have very good information concerning the true time 1 categories for the organizations. Otherwise, the accuracy of choices made at time 2 cannot be directly assessed. To know the classifications made by raters at time 1 is not enough, unless those classifications have been made with little or no error.

Golden (1992) initially framed his main analysis as a study of intertemporal reliability, but he subsequently argued that his time 1 data were substantially error-free and could be used to assess the validity of chief executive retrospective reports. Thus, he interpreted lack of intertemporal agreement as evidence of retrospective errors in reporting actual 1984 strategies: "The current findings indicate substantial retrospective errors, not errors in reporting strategies during the first phase of data collection" (1992: 851). He based his argument for substantially error-free time 1 data on the evidence of convergent validity reported by Shortell and Zajac (1990) for the time 1 observations. Although 24 out of 25 convergent validity coefficients were significant or approached significance ($p < .1$) in the Shortell and Zajac study that included Golden's time 1 observations, assertions about validity should be based primarily on the strength of the validity coefficients, not on statistical significance (although it is common for statistical significance to be used). Shortell and Zajac's largest convergent validity coefficient was only .36, and the average was only .17.[2] The low magnitudes of these correlations

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[1] Although intertemporal reliability is closely aligned with percent agreement, the two are different. Intertemporal reliability builds on percent agreement but goes beyond it to represent the likelihood (adjusted for chance agreement) that a chief executive places his or her organization at time 2 into the category he or she would typically classify the organization into in an infinite series of classification trials.

[2] These correlation coefficients representing convergent validity were calculated from *F*s

suggest that the time 1 data were not reasonably error-free (i.e., were not highly valid) and, therefore, should not have been used to assess retrospective validity. Thus, the imperfect time 1 data do not support any treatment of the issue as a question of validity. We treated our reanalysis of the Golden data as a study of reliability and treated our intertemporal coefficients as indirect rather than direct indicators of accuracy.

Having framed this as a study of reliability, we used a reliability index being used in marketing for qualitative judgments (cf. Perreault & Leigh, 1989). This index avoids the limitations that plague percent agreement as an indicator of intertemporal reliability or retrospective validity. The index incorporates an adjustment for chance intertemporal agreement, and more importantly, it focuses on underlying reliability as opposed to the joint probability of intertemporal agreement. To assess the degree to which Golden's (1992) results would have been more encouraging if an appropriate accuracy index had been used, we reanalyzed the intertemporal reliability in his data with the Perreault and Leigh (1989) index.

Reanalysis of Intertemporal Reliability in Retrospective Reports

Chief executives of 259 hospitals provided data for Golden's (1992) study. As noted above, each executive indicated his or her firm's current strategy in 1984, and two years later, each provided a retrospective report of that strategy. More specifically, each chief executive was asked to read a one-page description of Miles and Snow's (1978) four strategies and either (1) circle a number on a seven-point continuum running from defender to prospector, with analyzer in the middle, or (2) select the residual reactor category. Golden categorized their responses into a cross-tabulation table, which is reproduced as Table 1.

The intertemporal reliability of the retrospective strategy classification is .48 when all four of Miles and Snow's categories are included. However, several arguments in Miles and Snow (1978) and some empirical evidence (Doty, Glick, & Huber, 1993; Shortell & Zajac, 1990) suggest that the reactor category is a residual category that should be dropped from these analyses. When it is dropped, the intertemporal reliability is .53. Both of these estimates of intertemporal reliability are slightly less pessimistic than the 42 percent agreement reported by Golden.

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provided in Table 2 of Shortell and Zajac (1990). The formula for converting these ratios is as follows: $corr = \sqrt{F} / [F + (df, error / df, nonerror)]$ (Rosenthal, 1991). We calculated convergent validity coefficients somewhat stronger than Shortell and Zajac's (1990) for a sample of HMOs studied by Conant, Mokwa, and Varadarajan (1990) using the same measure of strategy as Golden (1992). The average of these coefficients was .34 (the coefficients were calculated from *F*s provided in Conant et al.'s Table 3). James and Hatten (1995) also provided insights into the convergent validity of the nominal Miles and Snow measure. Using archival data, they found that less than 45 percent of organizations could be placed into the categories specified by chief executive officers. Finally, Hambrick (1981) provided convergent validity estimates on the basis of ordinal rather than nominal data: .56 was the estimate for colleges, .46 for hospitals, and .41 for insurance firms.

TABLE 1
Golden's (1992) Frequency Data[a]

Reported Time 1 Strategy	Time 1 Strategy Reported at Time 2				
	Defender	Analyzer	Prospector	Reactor	Totals
Defender	4	1	0	1	6
Analyzer	48	**88**	17	12	165
Prospector	7	23	**13**	4	47
Reactor	10	24	3	**4**	41
Totals	69	136	33	21	259

[a] Bold figures indicate the number of matches between retrospective and nonretrospective reports.

ATTENUATION OF RELIABILITY

The second methodological issue concerns attenuation caused by the questionnaire methodology used to assess strategy. The reliability of any methodology is not perfect. Thus, even if retrospective recall of strategic actions is perfect, a questionnaire assessment will not yield a perfect retrospective accuracy coefficient. Such coefficients are attenuated because of the simple measurement error associated with the questionnaire measure itself. If a strong retrospective accuracy coefficient is the goal, it is imperative to use a measure that has adequate reliability and validity.

The measure used by Golden (1992), however, has questionable reliability and validity. With this frequently used measure, respondents are asked to read four complex paragraphs describing the four Miles and Snow strategies. Multiple, partially overlapping attributes are used in the description of each strategy. Respondents are expected to use these descriptions of the strategies to either classify an organization into a discrete category or rate the organization along a single dimension running from defender to prospector. This is a complex judgment that can introduce substantial measurement error.[3]

Empirical Evidence of Weakness in the Measure

Several available studies provide interrater agreement estimates for Golden's (1992) measure, and these estimates support our contention that the measure is problematic. These studies used the same basic measure of strategy as Golden and raters who seem to have been knowledgeable about the focal organizations, and they assessed current, not retrospective, strategy. As Table 2 shows, the estimated interrater agreement coefficients are not strong, ranging from .39 to .65, with an average of .54. These interrater agreement estimates provide a rough gauge of the amount of error produced by the strategy measure itself.

Two studies provide test-retest agreement estimates, and these estimates

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[3] Doty and colleagues (1993) presented an alternative approach for assessing Miles and Snow's (1978) typology that is much more consistent conceptually with the latter.

TABLE 2
Summary of Agreement Studies

Type of Agreement	Name and Date of Study	Number of Organizations	Industry	Raters	Agreement Coefficient
Interrater	Coleman (1978)	27	Mixed	CEOs who (1) managed competing firms and (2) were located in the same metropolitan area as the firm to be rated (e.g., CEOs from firms A, B, and C rated firm D).	.39
	Meyer (1979)	19	Health care	Experts who (1) worked in the health care field and (2) were located in the same metropolitan area as the organization to be rated.	.58
	Hambrick (1981)	77	Mixed	For each of three industries, experts who (1) held jobs within the industry and (2) were located in the geographic area from which the organization had been drawn.	.65[a]
	Shortell & Zajac (1990)	8	Health care	Executives within the corporation.	.52[b]
Test-retest	Shortell & Zajac (1990)	19	Health care	CEOs of the organizations.	.71
	Conant et al. (1990)	102	Health care	Marketing directors of the organizations.	.75

[a] Hambrick (1981) reported concordance coefficients that correspond to reliability coefficients (these cannot be converted to simple agreement). In most cases, a concordance coefficient will be higher than the simple agreement coefficient. The reported value is the average concordance coefficient for three samples.

[b] Shortell and Zajac (1990) reported concentration scores (Ray & Singer, 1973), which are generally higher than simple agreement coefficients. The reported value is the average concentration score for 8 organizations.

also support the contention that the measure is an issue.[4,5] As Table 2 shows, the two test-retest analyses yielded an average disagreement rate of 27.5 percent. Because the two analyses were based on very short lags between administrations of the instrument (a few weeks at most), the test-retest agreement is probably inflated by raters simply remembering what they said at time 1 rather than independently applying the instrument at time 2.[6] Assuming that only 10 percent of the agreement found in the two analyses was due to such carryover effects, the adjusted test-retest disagreement rate is 35 percent.[7] Thus, a substantial percentage of individuals reported different strategies after approximately 14 days. Considering these results, it seems clear that the low intertemporal reliability exhibited in the Golden data was caused to a significant degree by the underlying measure of strategy.

Further Empirical Evidence: Attenuation in Retrospective and Nonretrospective Reports

Fox (1992) collected both retrospective and nonretrospective strategy data using a measure of strategy developed by Glick, Huber, Miller, Doty,

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[4] Shortell and Zajac (1990) used the same measure as Golden (1992), but they reported test-retest results based on continuous data generated through the seven-point scale that runs from defender through analyzer to prospector (the reactor category is omitted). Shortell and Zajac reported the percentage of CEOs who described strategies that were the same or one-scale-point different from their initial responses. Conant and colleagues (1990), in the second test-retest study, used categorical data and all four categories. A third study containing test-retest data (Hambrick, 1981) is not examined here because the researcher assessed test-retest reliability with a correlation coefficient based on responses to the seven-point scale. The problem is that a correlation coefficient based directly on continuous data does not necessarily reflect the true level of underlying test-retest agreement. For example, in an extreme case, if each rater provides a response that is different from time 1 by a factor of +2, the underlying level of test-retest agreement is 0, but the correlation coefficient is 1.0. As a practical matter, the study in question probably produced agreement comparable to the two studies discussed in the text, but we cannot be sure.

[5] Test-retest agreement for nominal data equates to the sum of joint probabilities, and therefore it is subject to the same criticism we discussed earlier concerning percent agreement (interrater agreement is not subject to this criticism). Nonetheless, we did not translate the test-retest agreement coefficients to reliability coefficients because we wanted the test-retest information to be maximally comparable to Golden's (1992) percent agreement (further, in one of the two cases, we could not translate to a reliability coefficient because of the manner in which agreement was assessed).

[6] Although carryover effects (i.e., simply remembering what was said at time 1 rather than independently applying the instrument at time 2) may be marginally acceptable in a study of intertemporal reliability, where the issue is the reliability of an informant's memory, such effects are unacceptable in a study of test-retest reliability, where the issue is the reliability of the measure itself.

[7] This figure (35 percent) reflects a 10 percent increase in disagreement as follows: .275 + [(.10 × 88 respondents exhibiting agreement)/121 total respondents]. The 35 percent could be considered acceptable for some purposes, but it is certainly not acceptable for a study of retrospective accuracy in which simple measurement error should be kept to a minimum. Using a measure with a 35 percent test-retest disagreement rate is especially inappropriate if measurement error is not measured and separated from recall error.

and Sutcliffe (1990). As described below, this measure of strategy is similar to the measure used by Golden (1992). Our analysis of Fox's results further supports the contention that the low intertemporal reliability exhibited in Golden's data was caused to a significant degree by the underlying measure of strategy. Further, our analysis suggests that CEO reliability is no lower in retrospective than in nonretrospective reports.

Fox (1992) asked multiple raters to assess firms' current strategies and, retrospectively, the strategies they had six years prior to the data collection. Thirty-one financial and banking experts in a small metropolitan community provided assessments for seven banks in the community. The informants included the CEO and 3 senior officers of each of the seven banks, and 3 finance professors at the local university. Each informant rated all seven banks. Thus, each bank was assessed by 4 inside officers, 24 outside officers from competitor banks, and 3 finance professors. The informants were asked to rate the extent to which each of the four Miles and Snow strategy descriptions characterized a bank's strategy (the same basic strategy descriptions used in the studies discussed above were used here). Thus, using four 7-point scales, the informants rated the extent to which a given bank exhibited a defender strategy, an analyzer strategy, and so on. This was done retrospectively for the time six years prior to data collection and nonretrospectively for the current time period.

In our reanalysis of Fox's (1992) data, we reduced each of the four 7-point scales to three categories (category 1 included scale points 1 and 2; category 2 included scale points 3, 4, and 5; and category 3 included scale points 6 and 7). This approach helped to make our analyses more comparable to the nominal-level analyses reflected in Golden (1992) and in the studies discussed above. To assess the rater reliability of the CEOs, we compared CEO judgments for their own banks with the judgments given by the other raters. That is, we determined whether a CEO's judgment for a given strategy (e.g., category 1, 2, or 3 for defender) matched the category that most of the other raters chose when assessing that strategy for the CEO's bank (the most chosen category for a particular bank is called the mode for that bank). After determining, for a given Miles and Snow strategy, whether each CEO had chosen the mode for his or her own bank, we calculated the percentage of CEOs who had chosen the most chosen category for their banks (e.g., 71.43 percent for the defender strategy if 5 of 7 CEOs agreed with the mode). Finally, we translated this percentage pertaining to a given Miles and Snow strategy into an estimate of CEO rater reliability using the Perreault and Leigh (1989) index.

CEO rater reliability in Fox's (1992) data was remarkably similar for both retrospective and nonretrospective reports (keep in mind that CEO retrospective data were compared to other raters' retrospective data and CEO nonretrospective data were compared to other raters' nonretrospective data when assessing CEO reliability). In both cases, CEO rater reliability was weak regardless of the comparison group (insiders, outsiders, and finance professors were used in various analyses to determine which category a CEO

should have selected). Contrary to arguments about retrospective error, CEO rater reliability was not even slightly lower for retrospective reports than for nonretrospective reports (an average .52 versus an average .51; see Table 3). Thus, CEOs were no less reliable when retrospectively rating strategy than when nonretrospectively rating strategy. This finding clearly suggests that most of the error in the Golden study was caused not by faulty retrospective thinking but by the measure itself. Although not conclusive alone, Fox's (1992) data, in conjunction with the evidence reviewed earlier, point to the measure as the major source of difficulty in the Golden study.

Plausible Adjustments for the Estimates of Intertemporal Reliability

Given a range from .39 to .75 for the prior estimates of interrater and test-retest agreement using the same basic measure of strategy as Golden (1992), given no evidence of faulty retrospective thinking in Fox's (1992) data, and given the complexity of the measure of strategy Golden used, it is plausible to assert that the low estimates of intertemporal reliability for Golden's retrospective reports (.48 and .53) are partially attributable to simple measurement error. Thus, we examined plausible adjustments of Golden's (1992) results by treating a portion of his intertemporal disagreements as being attributable to the somewhat weak measure of strategy itself. Based on the distribution of observed estimates of interrater and test-retest agreement and based on the complexity of the multifaceted stimulus paragraphs in the questionnaire measure, a conservative estimate is that more concrete, unidimensional, descriptive measures of organizational strategy would yield 15 to 55 percent fewer intertemporal disagreements. As shown in Table 4, assuming that 15, 25, 35, 45, and 55 percent of the disagreements could have been eliminated by simply using a stronger measure (not a perfect measure, just a stronger one) results in estimates of intertemporal reliability that range from marginal (.59) to very good (.83). For example, if we assume that 35 percent of the disagreements were excess disagreements caused by the measure, then eliminating them results in adjusted intertemporal reliability estimates of .71 for the full complement of four categories and .73 for the three nonreactor categories.

DISCUSSION

Results of our analyses suggest that a significant portion of the error reflected in Golden's (1992) data is attributable to the somewhat low reliability of the questionnaire measure of strategy. Results of interrater and test-retest analyses suggested substantial error from the measure. Our re-analysis of Fox's (1992) data failed to show lower CEO rater reliability for retrospective reports than for nonretrospective reports, reflecting a lack of evidence of CEO fallibility in recalling the past.

Although Golden (1992) did not call for complete abandonment of ret-

TABLE 3
CEO Rater Reliability[a]

Appropriate Category Defined by	Retrospective						Nonretrospective					
	Reactor	Defender	Prospector	Analyzer	Average		Reactor	Defender	Prospector	Analyzer	Average
Insiders	.60	.60	.60	.60	.60		.60	.60	.60	.39	.55
Outsiders	.39	.60	.75	.75	.62		.60	.00	.60	.75	.49
Experts	.60	.00	.75	.00	.34		.39	.39	.57	.57	.48
Averages					.52						.51

[a] Table entries are reliability coefficients.

TABLE 4
Plausible Adjustments to the Observed Intertemporal Reliability Estimates That Could Be Achieved by Using Stronger Measures

Potential Percentage Reduction in Disagreements	Three Non-Reactor Categories		Full Complement of Categories	
	Percent Agreement	Adjusted Intertemporal Reliability	Percent Agreement	Adjusted Intertemporal Reliability
0%	.52	.53	.42	.48
15	.59	.62	.51	.59
25	.64	.68	.57	.65
35	.69	.73	.63	.71
45	.74	.78	.68	.76
55	.79	.83	.74	.81

rospective reports, subsequent authors (e.g., Bergh, 1993; Boyd, Dess, & Rasheed, 1993; Kumer et al., 1993; Martell, Guzzo, & Willis, 1995; Priem & Harrison, 1994) have taken extremely cautious positions in response to Golden's results. In contrast to these extremely cautious positions, our position is that organizational researchers can continue to rely on retrospective reports provided by chief executives *if* the measures executives are asked to use are adequately reliable and valid. We emphasize here that we are not saying retrospective reports are always acceptable. Retrospective reports (or any other data) should only be used when reasonable efforts to demonstrate reliability and validity can be reported.

One infrequently used method for improving the validity of retrospective reports is to use free reports rather than forced reports. Under the free report option, an informant providing retrospective data is encouraged to say that he or she does not remember if in fact that is the case. Under the forced report option, an informant is encouraged to answer the question, and no option to skip the question is explicitly given. Although loss of data from the free report approach reduces the number of organizations available for analysis, it raises the accuracy of responses used in analyses. In a recent study designed in part to investigate why some studies in experimental and social psychology find higher levels of retrospective accuracy than others, Koriat and Goldsmith (1994) found that the free report option was associated with reasonably high accuracy (76.6 to 92.7 percent in various experiments), whereas the forced report option was associated with lower accuracy (47.6 to 67.0 percent in various experiments). Lipton (1977) and others investigating eyewitness testimony have found consistent results: eyewitnesses exhibit higher accuracy when they are asked to discuss what they saw in a free recall format (where they can say as little or as much as they wish) as opposed to being asked specific questions with an expectation for an answer to each. Similarly, Cohen and Java (1994) found that individuals using the free report option in attempting to recall personal health events were very accurate in the sense that the events they did recall had really occurred.

Other methods for improving the validity of retrospective reports are discussed at length in other sources, but are too frequently ignored. Thus, we provide a brief review here. First, researchers should utilize multiple knowledgeable informants per firm to allow the information provided by any one informant to be checked against the information provided by other informants (Bagozzi & Phillips, 1982; Phillips, 1981; Seidler, 1974; Williams, Cote, & Buckley, 1989). Second, researchers should ask about simple facts or concrete events rather than past opinions or beliefs (Glick et al., 1990; Golden, 1992; Chen, Farh, & MacMillan, 1993). A focus on facts and concrete events is likely to be less subject to cognitive biases and impression management. Questions about abstract concepts and opinions pose complex, ambiguous judgment tasks for respondents. Third, researchers should not ask informants to recall facts or events from the distant past (Huber & Power, 1985). Fourth, researchers should motivate their informants to provide accurate information. To motivate informants, confidentiality should be ensured, the duration and inconvenience of data collection should be minimized, and rich explanations of the usefulness of the project should be given (Huber & Power, 1985).

Beyond strengthening retrospective reports through solid measures, the free report option, and the other tactics mentioned above, we would like to see researchers strengthen retrospective reports through statistically controlling for systematic forces that cause recall errors. In an important contribution, Golden (1992) was able to explain a portion of the variance in intertemporal disagreement, and therefore was able to provide some clues as to systematic causes of CEO recall error (although our work indicates that CEO fallibility and CEO recall errors are not as pervasive as Golden's results suggest, they generally are still present to some degree). Specifically, Golden found that past strategy, extent of strategic change, and current profitability explained some variance. These results can be used in future efforts to control for systematic sources of error in retrospective informant reports of firm strategy. By measuring and controlling for these systematic sources of error, it is possible to directly improve the validity of retrospective reports.

A great deal of strategic management and organization theory research has been and continues to be based on retrospective reports. In some cases, this reliance on retrospective reports results from shortsightedness or a willingness to cut corners. In many cases, however, the reliance on retrospective reports results from researchers' inability to gain access to organizations to take multiple measures over time. In some cases, the reliance on retrospective reports is brought about by a desire to study an event whose timing could not have been anticipated (e.g., the Three Mile Island accident, the Challenger space shuttle disaster). In all cases, researchers relying upon retrospective reporting should use sound measures, should consider using the free report option, and should adhere to the other guidelines generally associated with proper retrospective data collection (cf. Huber & Power, 1985). If this were done, scholars could truly be comfortable with the idea that retrospective reports are not fiction.

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WOMEN AND TRANSFORMATIONAL AND CONTINGENT REWARD LEADERSHIP: A MULTIPLE-LEVELS-OF-ANALYSIS PERSPECTIVE

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This study provides a multiple-levels-of-analysis investigation of transformational and contingent reward leadership and outcomes involving female leaders. We tested multisource data from male and female salespersons and their female sales managers for individual-, dyad-, and group-level effects via within and between analysis (WABA). As hypothesized, the associations of interest were based on differences between dyads. Each female leader formed a unique relationship with each subordinate that was independent of their group membership.

The purpose of this study was to replicate prior research on leadership and levels of analysis, with a focus on female leaders. We hypothesized and tested associations among transformational and contingent reward leadership and outcomes; our hypotheses and tests explicitly included levels of analysis. This study's unique contribution is its combining investigation of female leaders and levels of analysis. It also provides a new, levels-of-analysis view of female leader' relationships with both female and male subordinates and of subordinates' reactions to female leaders.

BACKGROUND

Women and Transformational-Charismatic Leadership

Transformational-charismatic leadership (e.g., Avolio & Yammarino, 1990; Bass, 1985, 1990; Bass & Avolio, 1990; House, 1977; Howell & Avolio, 1993; Yammarino & Bass, 1990; Yammarino & Dubinsky, 1994; Yammarino,

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Spangler & Bass, 1993; Yukl, 1994) entails a unique connection between a leader and her or his followers that can account for extraordinary performance and accomplishments of individuals, work groups, units, and organizations. Transformational-charismatic leaders go beyond merely seeking to satisfy the current needs of followers through transactions or exchanges via contingent reward behaviors (e.g., Graen & Scandura, 1987; Podsakoff & Todor, 1985; Podsakoff, Todor, & Skov, 1982).

Transformational-charismatic leadership involves leaders gaining the respect, trust, and confidence of others and transmitting a strong sense of mission to them. It includes leaders communicating a vision with fluency and confidence, increasing optimism and enthusiasm, and setting high expectations for themselves and followers. Transformational-charismatic leadership involves a relationship between a leader and subordinates that is personal and not based on formal, institutional rules, regulations, rewards, or punishments. In contrast, transactional–contingent reward leadership entails relationships that are impersonal. There is little affect, and the focus of the leader-follower relationship is on an exchange of rewards for services.

We were able to identify only three studies that specifically examined women and transformational-charismatic leadership. Druskat (1994) found that female subordinates rated female leaders as displaying significantly more transformational behaviors and significantly fewer transactional behaviors than male leaders who were rated by male subordinates. In a sample of nurses (97% women), Bycio, Hackett, and Allen (1995) discovered similar patterns and magnitudes of relationships for transformational leadership and its outcomes and transactional leadership and its outcomes. Bass, Avolio, and Atwater (1996) found that female leaders were rated by both female and male subordinates as displaying transformational leadership behaviors more frequently than male leaders. However, the effect sizes were very small, suggesting no practical differences between female and male leaders.

Positive associations between transformational-charismatic leadership and outcomes (e.g., Bass, 1985, 1990; Bass & Avolio, 1990; House, 1977; Howell & Avolio, 1993; Yammarino & Bass, 1990; Yammarino et al., 1993; Yukl, 1994) and between transactional–contingent reward leadership and outcomes (e.g., Bass, 1985, 1990; Bass & Avolio, 1990; Podsakoff & Todor, 1985; Podsakoff et al., 1982; Yammarino & Dubinsky, 1990, 1992; Yukl, 1994) established in studies of male leaders conceivably will be similar for female leaders (cf. Eagly & Johnson, 1990; Eagly, Karau, & Makhijani, 1995; Eagly, Makhijani, & Klonsky, 1992). At least two key categories of outcome variables can be identified from this prior work and are included in the current study: (1) performance (subordinate and leader effectiveness) and (2) subordinate reactions, or affect (e.g., commitment).

Transformational-Charismatic Leadership and Levels of Analysis

A remaining conceptual issue, however, is the assertion of the level or levels of analysis at which the associations among leadership and outcome

variables are expected to hold (cf. Bass, 1990; Dansereau, Alutto, & Yammarino, 1984; Dansereau, Yammarino, & Markham, 1995; Yammarino & Dubinsky, 1992). Three primary levels of analysis are relevant to understanding transformational-charismatic and transactional–contingent reward leadership (cf. Yammarino, 1996; Yammarino & Dubkinsky, 1994).

The *individual-differences* view indicates that each subordinate perceives her or his superior uniquely, or individually, and a superior likewise perceives each subordinate as a unique individual. Individuals are the focus for understanding leadership phenomena; work groups and dyadic relationships per se are not relevant. In the individual-differences view, which is compatible with the work of Lord and his colleagues (e.g., Lord, Foti, & DeVader, 1984; Hall & Lord, 1995), leadership is implicit and based on the information processing of individuals. Individual differences in subordinates' and superiors' responses are manifested in terms of differential perceptions, attributions, and cognitive categorizations (Hall & Lord, 1995; Yammarino & Bass, 1990; Yammarino & Dubinsky, 1992, 1994). Prior empirical work on transformational-charismatic and transactional–contingent reward leadership has found support for this perspective (e.g., Avolio & Yammarino, 1990; Yammarino & Bass, 1990; Yammarino & Dubinsky, 1994).

The *dyads-within-groups* view is suggested by Bass's (1985, 1990) theory of transformational leadership and House's (1977) view of charismatic leadership (cf. Dansereau, Yammarino, & Markham, 1995; Yammarino, 1996). This view indicates that superiors manage superior-subordinate relationships, which differ within a group, and that superiors of other groups act similarly. Thus, superiors have relatively similar behavioral repertoires, but the specific behavior displayed in any group depends upon the particular superior-subordinate relationship (cf. Dansereau, Graen, & Haga, 1975; Graen & Scandura, 1987). The *superior* establishes closer links with some subordinates (called in-group or cadre) than with others (out-group or hired hands). Thus, the superior's dyadic relationship with each member of the group differs from each other such dyadic relationship, and the superior manages each relative to the others in the group. Relatedly, Hall and Lord (1995) suggested that affective differences and resultant differences in leadership perceptions may occur for dyads within groups.

The *between-dyads* view is a purely dyadic perspective in which transformational-charismatic and transactional–contingent reward leadership phenomena are considered independent of formal work groups. This view is also suggested by the theories of both Bass (1985, 1990) and House (1977; cf. Dansereau, Yammarino, & Markham, 1995; Yammarino, 1996). Because dyads are viewed as independent, interpersonal, one-to-one relationships, both superior and subordinate are seen as having control and influence; this is a balanced interpersonal dyad (Yammarino, 1996; Yammarino & Dubinsky, 1992, 1994). Some superior-subordinate dyads show stronger relationships than others, and the perceptions and behaviors of the individuals in a dyad are similar (there is superior-subordinate agreement). Dansereau and colleagues (1984), Yammarino and Dubinsky (1992), and Dansereau, Yam-

marino, Markham, Alutto, Newman, Dumas, Nachman, Naughton, Kim, Al-Kelabi, Lee, and Keller (1995; henceforth, Dansereau et al., 1995) found empirical support for this balanced interpersonal view in tests of leadership and outcome relationships similar to those of interest in the present study. Relatedly, Hall and Lord (1995) suggested that reciprocal or mutual affect (e.g., liking) can influence stable differences between dyads in leader-follower relationships.

Women, Leadership, and Levels of Analysis

Researchers have focused on transformational-charismatic leaders' ability to get subordinates to transcend their own interests and to think and act in the interests of their group (Bass, 1985; House, 1977). In addition, there has been a focus on the tailoring of transformational-charismatic leadership within a group to each subordinate's needs and interests relative to those of the other subordinates (Bass, 1985; Bass & Avolio, 1990; House, 1977). This position is compatible with that of Yukl (1994), who argued that transformational-charismatic leadership may represent a distinct form of exchange within a group, a higher-order exchange with intangible rather than tangible benefits (cf. Graen & Scandura, 1987). Taken together, these arguments suggest that this type of leadership can be explained in terms of the dyads-within-groups view.

However, to the extent that leader reward behavior is contingent on the performance of a particular subordinate, and rewards are tailored to that subordinate, a between-dyads explanation of transactional–contingent reward leadership seems appropriate. Although the superior may control the rewards, the subordinate controls the performance. Thus, the parties exert mutual control and influence and are mutually dependent. In this instance, the focus seemingly is on unique one-to-one dyadic, interpersonal relationships. This conclusion seems particularly appropriate in view of previous research on female leaders.

The weight of the evidence indicates that female leaders favor an "interpersonally-oriented" leadership style, that others expect them to display such a style, and that female leaders are successful and effective when they do so (e.g., Eagly, 1987; Eagly et al., 1992, 1995).

The gender-stereotypic feminine leadership style is one in which women display high levels of communal (rather than agentic) attributes such as friendliness, unselfishness, concern for others, and emotional expressiveness (Eagly et al., 1992, 1995). Such leadership is collaborative, democratic, and interpersonal; such leaders help subordinates, do favors for them, and look out for them. Informality, warmth, cooperativeness, low leader control, a participative decision-making style, and problem solving based on intuition and empathy as well as rationality characterize female-stereotypic leadership. These characteristics appear to suggest the likelihood of one-to-one dyadic relationships based on the unique connection between a leader and each of her subordinates.

Hypotheses

Our hypotheses concern the level of analysis at which women's transformational leadership can best be explained. The above discussion implies the relevance of dyadic relationships based on unique, one-to-one relationships between a leader and each of her subordinates, male or female, irrespective of group. Thus,

> *Hypothesis 1: Transformational-charismatic leadership is positively related to subordinates' commitment and performance and female leaders' effectiveness at the between-dyads level of analysis (associations are based on between-dyads differences).*

> *Hypothesis 2: Transactional–contingent reward leadership is positively related—although to a lesser degree than transformational-charismatic leadership—to subordinates' commitment and performance and female leaders' effectiveness at the between-dyads level of analysis (associations are based on between-dyads differences).*

METHODS

Sample

The sample consisted of members of the sales forces of a variety of organizations in the eastern United States traditionally considered to constitute male-dominated sales environments; examples are IBM and Southern Bell. To test the hypotheses of interest, we sought sales groups consisting of one female sales manager (superior) and two salespeople (subordinates). Female sales managers are somewhat rare because sales positions in general and sales manager positions in particular tend to have male incumbents. We contacted 69 female managers from different companies by telephone and asked them to participate in the study by completing questionnaires about their relationships with two randomly selected subordinates, one female and one male. Each subordinate was also asked to complete a similar questionnaire about her or his relationship with the manager.

In all, 31 superiors (44.9 percent of the individuals contacted) and 61 subordinates returned completed questionnaires. After matching superior and subordinate reports, we had complete, usable data for 15 sales groups: 15 male and 15 female subordinates and their 15 different female superiors. So, 30 subordinate reports about the superiors and 30 superior reports about the subordinates were obtained regarding 15 groups and 30 dyads. This approach permitted individual-, dyad-, and group-level effects to be displayed and tested. The effective response rates were 21.7 percent of the contacted sample and 48.4 percent of the superiors who returned completed questionnaires. We considered these rates acceptable because of the relative scarcity of female sales managers, the time commitment required of respon-

dents, and the difficulty of obtaining nonanonymous completed questionnaires in matched sets.

The 15 superiors were well educated, as 86.7 percent had at least some college education. Their median age was between 40 and 50 years (29–39 years, 46.7%; 40–50 years, 40.0%; 51–61 years, 13.3%). The median number of years of employment with their present companies was longer than 4 years (2–4 years, 13.3%; 4–10 years, 60.0%; 10 years or more, 26.7%). Their median tenure in their present positions was greater than 2 years (less than 6 months, 6.7%; 6 months to 1 year, 13.3%; 1 to 1.5 years, 20.0%; more than 2 years, 60.0%).

The 30 subordinates were relatively young (60 percent were less than 40 years old) and well educated (67 percent had a college degree or better). They also were relatively experienced, as 53.0 percent had been in their present organizations for more than 2 years and 53.0 percent had been in their present jobs for more than 2 years. Forty percent had been with their present superiors for more than 2 years. The male and female subordinates were comparable in age, education, tenure with the organization, and tenure with the current superior. Although the men's job tenure was significantly longer than that of the women (Kruskal-Wallis $\chi^2 = 5.64$, $p < .05$), tenure in the current job did not correlate with any variable of interest in this study.

Measures

Two leadership measures were obtained using items from the Multifactor Leadership Questionnaire (MLQ; Bass & Avolio, 1990). Respondents (subordinates and superiors) were asked the frequency with which perceptions and behaviors described by items occurred in the relationship between a superior and a specific subordinate. Potential responses for each item ranged on a five-point format from 0, "not at all," to 4, "frequently, if not always." To measure the dimensions of *transformational leadership*—charisma, inspiration, individual consideration, and intellectual stimulation—we used 37 items from the MLQ. To assess *contingent reward leadership*, 10 items from the MLQ were used.

An overall transformational leadership measure, rather than four dimensions, was used in all analyses for several reasons. First, critics of the MLQ (e.g., Bycio et al., 1995; Tepper & Percy 1994) have questioned its dimensionality, and in the current and prior studies there were very high correlations among the dimensions in data from both superior and subordinate reports. Second, recent theoretical (e.g., Bass, 1990; Yukl, 1994) and empirical (e.g., Yammarino & Dubinsky, 1994; Yammarino et al., 1993) work suggests an overall measure is a parsimonious, valid, and reliable approach, particularly when contingent reward leadership is also being investigated. Third, in the current study, there was no difference between the results and inferences for the overall transformational leadership measure and relationships involving it and results and inferences for separate dimensions and relationships involving them.

Three outcome measures were also obtained via questionnaire re-

sponses from subordinates, superiors, or both. First, subordinate *commitment* was assessed via 5 items adapted from Howell and Avolio (1993). We modified the items slightly to ensure matching on superior and subordinate forms and focused on commitment to organization, job, and superior. Potential responses for each item ranged on a five-point format from 0, "disagree strongly," to 4, "agree strongly."

Second, superiors were asked to rate each of their subordinates using a 10-item multidimensional performance measure (Yammarino & Dubinsky, 1990). This measure, designed for evaluating salespeople, included criteria such as the profitability of sales efforts, overall work attitude, and product knowledge. Potential responses for each item ranged on a five-point format from 0, "poor," to 4, "excellent." This measure is called *subordinate performance.*

Third, subordinates were asked to rate their superiors' performance using the MLQ 4-item effectiveness measure (Bass & Avolio, 1990). This measure assessed a superior's effectiveness in meeting subordinate, unit, and organizational needs. Potential responses for each item ranged on a five-point format from 0, "not effective," to 4, "extremely effective." This measure is called *superior effectiveness.*

Descriptive Statistics

Female and male subordinates may rate female leaders differently, and likewise, female leaders may rate their female and male subordinates differently (cf. Eagly et al., 1992, 1995; cf. Eagly & Johnson, 1990). Thus, before conducting tests of hypotheses involving effects of levels of analysis, we employed analysis of variance (ANOVA) to test for any gender-related differences on the variables of interest. There were no differences, for any of the variables, between the responses of female and male subordinates to items about their female superiors, and there were no differences between female superiors' responses about female and male subordinates. We therefore pooled these data in all analyses.

Table 1 presents descriptive statistics for all measures. We calculated separate reliabilities (coefficient alpha) for subordinates and superiors to determine the internal consistency of the multiple-item (summed) scales. All scales yielded reliabilities deemed adequate for further analyses.

Data Analysis

Within and between analysis (WABA), a multiple-level technique, was used to test for and draw conclusions about level effects; for details on this technique, see Dansereau and colleagues (1984) and Yammarino and Markham (1992). There are three steps in WABA.

First, *each variable* is assessed at a particular level to determine whether it varies primarily between, within, or both between and within the units of interest (e.g., groups). Within and between etas are used to assess sources of variation, and the difference between them is tested with F-tests of statistical

TABLE 1
Descriptive Statistics[a]

Variables	Subordinate Reports			Superior Reports		
	α	Mean	s.d.	α	Mean	s.d.
Leadership						
Transformational	.97	2.75	.71	.91	3.03	.35
Contingent reward	.88	2.60	.83	.74	2.71	.53
Outcomes						
Subordinate commitment	.85	3.64	.55	.74	3.26	.49
Subordinate performance				.84	2.92	.49
Effectiveness of superior	.86	2.89	.81			

[a] Based on responses of 30 subordinates (15 women, 15 men) and their 15 superiors (women) reporting about each of them.

significance and *E*-tests of practical significance (magnitude of effects). These procedures are called *WABA I.*

Second, *each relationship* among variables is assessed at a particular level to determine whether the covariation is primarily between, within, both between and within, or neither between nor within the focal units. Between- and within-cell correlations are used to assess covariation among variables, and their difference is tested with *Z*-tests of statistical significance and *A*-tests of practical significance. Moreover, analysts test each between- and within-cell correlation for statistical and practical significance using *t*- and *R*-tests, respectively. These procedures are called *WABA II.*

Third, using the WABA equation, the analysts combine the results of the first two steps to draw an overall conclusion from the data. In particular, within and between *components,* which total to the traditional raw-score correlation, are examined to draw an inference about the level of analysis at which effects operate.

If results indicate variation and covariation both between and within dyads and between and within groups, equivocal effects are evidenced at these levels. In conjunction with significant individual-level (raw-score) correlations, these findings suggest that individual differences are present. Inference of individual differences requires results that are significant between and within both groups and dyads, and significant raw-score correlation results. In this case, transformational and contingent reward leadership and their outcomes would be individual-level phenomena.

If dyad-level results are equivocal but results indicate significant variation and covariation within and not between groups, then groups are relevant, and there is a relative positioning of individuals within the groups. In conjunction with significant individual-level correlations, these findings suggest that dyads-within-groups differences are evidenced. To infer dyads-within-groups differences, results that are significant within and between dyads, significant within groups, and nonsignificant between groups are required. In this case, leadership and outcomes would be group-level phenomena.

If group-level results are equivocal but results indicate significant variation and covariation between but not within dyads, then there is superior-subordinate agreement on the variables within dyads. In conjunction with significant individual-level correlations, these findings would be evidence of between-dyads differences. To infer between-dyads differences, results that are significant between and within groups, significant between dyads, and nonsignificant within dyads are required. In this case, leadership and outcomes would be dyad-level phenomena.

RESULTS

The first section of Table 2 summarizes results from within- and between-dyads analyses. These results are based on superior-subordinate multirater reports for transformational and contingent reward leadership and subordinate commitment. Because subordinate performance (superior reports) and superior effectiveness (subordinate reports) are both measures of performance, we analyzed them as multirater reports of that variable. For contingent reward leadership, both the E- and F-tests of the etas are significant. This variable displays significant superior-subordinate agreement and varies primarily between dyads. Transformational leadership, subordinate commitment, and performance are interpreted as equivocal at the dyad level, varying both within and between dyads. The results of the A- and Z-tests indicate that, for all four relationships, the significant between-dyads correlations (.71, .79, .58, and .74) differ significantly from the within-dyads correlations. Moreover, three (.14, .20, and .36) of the four within-dyads correlations are not significant (only .53 is significant). Overall, the relationships display primarily between-dyads covariation and superior-subordinate dyadic agreement. The results of the A-tests indicate that for three of the four relationships, the between-dyads components differ significantly from the within-dyads components. For the fourth relationship, involving transformational leadership and performance, the difference between the components is marginally significant (13 degrees rather than 15 degrees). Thus, all relationships can be viewed as operating at the dyad level of analysis, displaying between-dyads effects (see the column labeled "Inference"). The results of the R- and t-tests respectively indicate that the individual-level raw-score correlations are both practically and statistically significant.

The second section of Table 2 summarizes results from within- and between-groups analyses based on subordinate (same-source) reports. For superior effectiveness, both the E- and F-tests of the etas are significant. This variable varies primarily between groups. Transformational leadership, contingent reward leadership, and subordinate commitment are interpreted as equivocal at the group level, varying both within and between groups. There is no relationship for which the A- and Z-tests of the within- and between-groups correlations and the A-test of the within- and between-groups components are significant. Moreover, all within- and between-groups correlations are significant. Thus, these results indicate variation and covariation

TABLE 2
Dyad- and Group-Level Results

Level and Relationships[a]	Etas[e]		Correlations[f]		Components[g]		Raw-Score Correlations[h]	Inference
	Between	Within	Between	Within	Between	Within		
Dyad (subordinate-superior)[b]								
Transformational leadership and								
Subordinate commitment	.70	.72	.71††**	.14	.38†	.07	.45†**	Between dyads
Performance	.78	.63	.79†**	.53	.44	.23	.67†††**	Between dyads (weak)
Contingent reward leadership and								
Subordinate commitment	.79†	.61	.58†*	.20	.36†	.08	.44†**	Between dyads
Performance	.80†*	.60	.74†*	.36	.47†	.13	.60†††**	Between dyads
Group (subordinate)[c]								
Transformational leadership and								
Subordinate commitment	.81†	.59	.78	.77	.46	.31	.77†††*	Equivocal/nongroup
Superior effectiveness	.84†**	.54	.90†	.72	.61†	.23	.84†††**	Equivocal/nongroup
Contingent reward leadership and								
Subordinate commitment	.80†	.60	.82	.78	.36	.32	.68†††**	Equivocal/nongroup
Superior effectiveness			.73	.62	.50†	.20	.70†††**	Equivocal/nongroup
Group (superior)[c]								
Transformational leadership and								
Subordinate commitment	.78	.62	.15	.49†	.10	.13	.23	Null
Subordinate performance	.91†††**	.42	-.11	.54†	-.06	.23	.17	Null
Contingent reward leadership and								
Subordinate commitment	.71	.70	.10	.57†	.08	.10	.18	Null
Subordinate performance	.92†††**	.40	.26	.66†	.17	.19	.38†*	Equivocal/nongroup
Group (subordinate × superior)[d]								
Transformational leadership (subordinate) and subordinate performance (superior)			.39	.64†	.22	.26	.48†**	Equivocal/nongroup
Contingent reward leadership (subordinate) and subordinate performance (superior)			.38	.54	.22	.22	.44†*	Equivocal/nongroup
Transformational leadership (subordinate) and transformational leadership (superior)			-.26	.56†	-.16	.20	.04	Null

TABLE 2 (continued)

Level and Relationships[a]	Etas[e]		Correlations[f]		Components[g]		Raw-Score Correlations[h]	Inference
	Between	Within	Between	Within	Between	Within		
Contingent reward leadership (subordinate) and contingent reward leadership (superior)			.31	.39	.23	.09	.32†	Null
Subordinate commitment (subordinate) and subordinate commitment (superior)			.44	.28	.28	.08	.37†*	Equivocal/nongroup
Superior effectiveness (subordinate) and subordinate performance (superior)			.33	.23	.20	.09	.29†	Null

[a] "Superior" and "subordinate" in parentheses indicate the source of the data.

[b] Analyses are based on $N = 60$ and $J = 30$. All relationships are based on superior-subordinate matched reports.

[c] Analyses are based on $N = 30$ and $J = 15$. All relationships are based on same-source (subordinate or superior) data.

[d] Analyses are based on $N = 30$ and $J = 15$. All relationships are based on different-source (cross-rater) data. Etas are reported in the two prior sections of the table.

[e] Significant F-test (†) and F-test (*) results of the *difference* between the within and between etas are indicated for each variable.

[f] Significant between- and within-cell correlations, based on R-test and t-test results, are *bold*. Significant A-test (†) and Z-test (*) results of the *difference* between the within- and between-cell correlations are indicated for each relationship.

[g] Significant A-test (†) results of the *difference* between the within and between components are indicated for each relationship.

[h] Significant raw-score correlations, based on R-test (†) and t-test (*) results, are indicated.

† 15 degree
†† 30 degree
* $p < .05$
** $p < .01$

both between and within groups and are called equivocal at the group level, or "nongroup." The results of the R- and t-tests indicate that all the individual-level raw-score correlations are significant. Overall, the relationships of interest do not hold at the group level of analysis, but are based on individual differences in responses of subordinates.

Results from within- and between-groups analyses based on superior (same-source) reports appear in the third section of Table 2. For subordinate commitment and contingent reward leadership, both the E- and F-tests of the etas are significant. These variables vary primarily between groups (superiors). Transformational leadership and subordinate performance are interpreted as equivocal at the group level, varying both within and between groups. There is no relationship for which the A- and Z-tests of the within- and between-groups correlations and the A-test of the within- and between-groups components are significant. Although three of the four within-groups correlations are significant, none of the between-groups correlations are significant. Moreover, three of the four individual-level raw-score correlations lack significance. So, these findings are generally null at the group (superior) level, holding neither at that level (for all four relationships) nor in terms of individual differences in responses of superiors (for three of four relationships).

The fourth section of Table 2 summarizes results from within- and between-groups analyses based on superior-subordinate (cross-rater) reports. These results are based on different-source data. The etas, interpreted above as generally equivocal at the group level, are not reported again here. There is no relationship for which the A- and Z-tests of the within- and between-groups correlations and the A-test of the within- and between-groups components are significant. Only three of the six within-groups correlations are significant, and none of the between-group correlations are significant. The respective results of the R- and t-tests indicate that three of the six individual-level raw-score correlations are practically and statistically significant. Thus, none of the relationships operate at the group level of analysis: three are equivocal and three are null. But three of the six associations display individual-level effects, reflecting individual differences in the responses of superiors and subordinates and showing some cross-rater agreement.

DISCUSSION

Multiple-Level Inferences

The results in Table 2 provide clear support for the hypotheses of interest. First, transformational and contingent reward leadership were positively related to subordinate commitment and performance and female leaders' effectiveness. Contrary to some work (e.g., Bass, 1985, 1990; Bass & Avolio, 1990), however, the magnitudes of the correlations (both individual-level raw-score and between-dyads) between transformational leadership and outcomes are similar to the correlations between contingent reward

leadership and those same outcomes. This lack of significant difference in the correlations is compatible with Yukl's (1994) suggestion regarding the similarity of these types of leadership and with the findings of Yammarino and Dubinsky (1994).

Second, the associations among the variables of interest held at the between-dyads level of analysis, displaying significant between-dyads differences for three of four relationships. The fourth relationship showed the same trend but reached only a marginal level of significance. These findings are consistent with work of Dansereau and colleagues (1984, 1985) and of Yammarino and Dubinsky (1992), who obtained dyad-level effects for variables similar to some used in this study. Moreover, the results are compatible with the work of Eagly and her colleagues (e.g., Eagly, 1987; Eagly et al., 1992, 1995), which suggested the importance of interpersonally oriented dyadic relationships for female leaders and their subordinates, and with the work of Hall and Lord (1995), which suggested the importance of between-dyads differences for understanding followers' perceptions of leadership. The current findings are, however, somewhat contrary to those of Avolio and Yammarino (1990), Yammarino and Bass (1990), and Yammarino and Dubinsky (1994), who found only individual-level effects for similar variables.

Third, in the current study, some individual-level effects were also obtained. In particular, the individual-level raw-score correlations among the variables for the subordinate-superior reports and subordinate reports (first two sections of Table 2) are all practically and statistically significant, and some of those for the superior reports (third section of Table 2) and the subordinate-by-superior reports (fourth section of Table 2) are significant. More importantly, these results aggregated, crossed levels of analysis, and displayed between-dyads differences, a dyad-level effect. But these between-dyads differences did not aggregate to a still-higher group level of analysis. This conclusion is clear from the generally equivocal or null group-level results in Table 2 and from additional analyses (not shown to conserve space) in which between-dyads results failed to aggregate to the group level.

Implications

The dyad-level results (between-dyads differences) obtained in this study mean that female leaders form unique one-to-one interpersonal relationships with their male and female subordinates. These dyadic relationships are independent of one another, independent of group membership, display leader-subordinate agreement within each dyad, and hold for all associations among the variables investigated in this study.

This finding is rather powerful for several reasons. First, the dyad-level results are quite strong and consistent across all associations among variables. Second, the effects (which are both practically and statistically significant) were obtained despite the small sample, the problem of gathering information from female sales managers, and data collection in male-dominated settings. All of these elements worked against obtaining this effect. Third, the measures of leadership used have been validated with men

rather than women. The MLQ was primarily developed and refined on male subjects, so it may tap more masculine leadership styles. Nonetheless, results were strong enough to manifest themselves for female leaders. In other words, a small sample of female leaders in male-dominated settings responding to a male-validated survey provided a powerful set of effects. Thus, it is our belief that a strong, rigorous test has been conducted and that the results obtained are noteworthy.

A key implication for leadership theory is that female leaders appear to form, operate, and maintain relationships with subordinates on a dyadic basis, differentiating among their various dyadic relationships. At least in terms of the variables investigated here, leadership is an interpersonal process, independent of a group context, in which each subordinate and leader exert mutual control and influence over one another and are mutually dependent. Moreover, within each superior-subordinate dyad there is agreement on the dimensions of focus. Shamir, House, and Arthur (1993) posited that transformational-charismatic leaders motivate followers by engaging aspects of followers' self-schemata. The matching, or linking, of subordinates' schemata with appropriate superior behavior is a type of dyad-level effect. Likewise, Wayne and Ferris (1990) and Liden, Wayne, and Stilwell (1993) showed that expectations, perceived similarity, and liking are important in dyadic development. Thus, affective bonds, a key component of transformational-charismatic leadership, are linked to the quality and nature of superior-subordinate (leader-follower) dyadic relationships.

In the current study, differences between the effects of transformational and transactional leadership were absent. The magnitudes of the relationships between transactional-contingent reward leadership and outcomes and of those between transformational-charismatic leadership and outcomes were the same and operated at the same level of analysis. This absence of a difference seems important, given extensive discussions in the relevant literature about transformational leadership's more powerful, or augmenting, effect on outcomes. The results of this study suggest that when leaders are women, distinctions between transformational and transactional leadership may not be useful or necessary. Rather, differing dyadic interpersonal relationships among female leaders and their female and male subordinates appear to be the critical factor. Perhaps general dyadic development processes are operating, regardless of whether the leadership involves transformational or transactional behaviors. For example, as Dansereau and colleagues (1995) demonstrated, these processes can be initiated by a superior and responded to by a subordinate and can involve variables relevant to multiple types of leadership (e.g., developing a sense of self-worth in subordinates who respond with satisfying levels of performance for their superiors). Relatedly, the absence of dyads-within-groups effects in the current study implies that contextual (group-based) evaluations of transformational and transactional leadership are not important. Perhaps these cross-dyad comparisons within groups are irrelevant because sales activities involve independent efforts by sales personnel or only dyadic working relationships

between sales subordinates and superiors, and not group processes or activities in which peers interact to sell products.

Another possible explanation for the current dyadic results is the nature of the leaders and groups studied (i.e., one female and one male subordinate). Some female leaders may be able to display the transformational qualities and behaviors admired by male subordinates when working with them as well as the participative, democratic behaviors and characteristics evaluated favorably by female subordinates when engaging them. This ability to use different behavioral repertoires with different subordinates could promote dyad-level rather than group- or individual-level effects. Further exploration of these issues could be the subject of future data collection and studies designed to understand the processes involved.

In terms of managerial practice, levels-of-analysis issues as they relate to female leaders may be important. For example, allowing female leaders to engage in more one-on-one working relationships with subordinates may enhance both leader and subordinate effectiveness. These opportunities for female leaders may be critical regardless of the gender of the subordinate with whom they interact. Similarly, providing a working environment that encourages considerate, warm, participative, interpersonal relationships may result in stronger dyadic bonds between female leaders and their subordinates, thus fostering productivity, effectiveness, satisfaction, and commitment.

Limitations

Although the results of this study are interesting, and perhaps encouraging, several limitations of the present investigation warrant attention in future research before the conclusions are accepted. First, examining whether transformational-charismatic and transactional–contingent reward leadership effects aggregate or operate at still higher levels of analysis seems useful. In this study, the sample and the groups themselves were small. Perhaps in larger groups of subordinates reporting to a common superior, the group-level effects for transformational-charismatic leadership that previous research implies would be evidenced. Moreover, with larger samples and multiple organizations, researchers could explore other levels of analysis, including department, functional area, organization, and social system levels. To date, investigations have generally ignored the explicit incorporation of these higher levels of analysis in formulations and tests of transformational-charismatic and transactional–contingent reward leadership theories.

Second, leadership processes develop over time, so a cross-sectional study like the current investigation cannot capture the full range and dynamics of any leadership theory. Perhaps individual-level effects develop over time to a point at which superiors and subordinates reach agreement or consensus and dyad- or group-level effects are seen. Another possibility is that in times of organizational change or crisis, the operation of transformational-charismatic leadership shifts from one level (individual or dyadic) to

another (organizational) or becomes cross-level. These speculations could be investigated in future work.

Third, it is necessary to investigate the generalizability of the current results to other superiors and subordinates, both women and men, in other types of jobs and organizations. Because this study did not include male leaders, no systematic comparison of relationships and levels-of-analysis effects for female and male leaders was possible. Thus, differences between the results of the current study and those of prior research may be a result of the setting, leader effects, follower effects, the variables investigated, and so forth. A more comprehensive replication would also clarify whether the reported effects hold for same-gender and opposite-gender dyads involving both female and male leaders.

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ORGANIZATIONAL CONFIGURATIONS AND PERFORMANCE: A META-ANALYSIS

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The link between organizational configurations and performance has become a central and somewhat controversial focus of research in the strategic management literature. We statistically aggregated results from 40 original tests of the configurations-performance relationship. In contrast to previous qualitative reviews, this meta-analysis demonstrated that an organization's performance is partially explained by its configuration. Tests of four potential moderators showed that organizations' configurations contributed more to performance explanation to the extent that studies used (1) broad definitions of configurations, (2) single-industry samples, and (3) longitudinal designs. Results highlight the need for programmatic research.

Investigators from multiple disciplines study individual (e.g., Lieberson & O'Connor, 1972), group (e.g., Bantel & Jackson, 1989), organizational (e.g., Rumelt, 1974), industry (e.g., Porter, 1980), and environmental (e.g., Hannan & Freeman, 1977) factors that influence performance. The reported study is on the use of organizational configurations to better understand and predict organizational performance. Organizational configurations are defined as groups of firms sharing a common profile of organizational characteristics (Meyer, Tsui, & Hinings, 1993; Miller & Mintzberg, 1984). The Miles and Snow (1978) typology is a good illustration of configuration research. Miles and Snow described four configurations—defender, prospector, analyzer, and reactor—by examining stable relationships among structural and strategic variables. For example, defender organizations tend to have narrow market domains, centralized organizational structures, simple coordination mechanisms, and a single technology. In contrast, prospectors have broad domains, decentralized structures, complex coordination mechanisms, and multiple technologies.

In essence, the study of organizational configurations embraces a variety of research streams (e.g., Dess, Newport, & Rasheed, 1993; Galbraith & Schendel, 1983; Hatten & Schendel, 1977; Ketchen, Thomas, & Snow, 1993; Meyer et al., 1993; Miller & Friesen, 1978). Common to these research streams is the assumption that organizational phenomena can best be understood by identifying distinct, internally consistent sets of firms and their relationships to their environments and performance outcomes over time rather than by seeking to uncover one universal set of relationships that hold across all organizations. Nonetheless, previous qualitative reviews of the literature have suggested that empirical evidence of relationships between configuration membership and performance appeared to be equivocal (cf. Barney & Hoskisson, 1990; Thomas & Venkatraman, 1988). However, meta-analytic results from many arenas suggest variation in effect size—that is, in the strength of the relationship found—across studies may be due to sampling error (Hunter & Schmidt, 1990). Sampling error and other artifactual influences may have hindered prior reviewers' attempts to synthesize results across configurational studies. A logical extension of prior qualitative reviews is to meta-analyze results of empirical studies to discern the strength of the relationships between organizational configurations and performance these studies have shown.

The purpose of this study was to investigate whether (1) organizational configurations are related to performance and (2) study characteristics moderate this relationship. We meta-analyzed 40 empirical investigations of configurations-performance relationships. After estimating the average effect size corrected for random sampling error, we examined four study characteristics for moderating effects.

HYPOTHESES

The belief that performance differences can be attributed to configurations is grounded in structural contingency theory (cf. Meyer et al., 1993). An

early configuration idea is Weber's (1947) assertion that there are three types of authority in society—traditional, rational/legal, and charismatic—each of which has an appropriate administrative structure (Ketchen et al., 1993). Weber (1947) predicted the evolution and prosperity of these types to be contingent upon certain societal conditions. Subsequently, Burns and Stalker (1961) identified two organizational structures, mechanistic and organic, and suggested each prospered in particular types of environments: the mechanistic in a stable environment, the organic in a dynamic environment. Woodward (1958), Lawrence and Lorsch (1967), and Galbraith (1973) have offered a similar logic. Thus, viewing the success of organizational types (or configurations) as a function of their appropriateness to environmental conditions is central to structural contingency theory.

Subsequent strategy researchers began to identify organizational configurations that appeared to be equally effective in multiple environments (e.g., Miles & Snow, 1978; Miller & Friesen, 1978). Empirical research has suggested that these configurations are not universally effective. For example, Snow and Hrebiniak (1980) found that analyzers, defenders, and prospectors outperformed reactors in three of four industries. In the fourth industry they studied, which was highly regulated, reactors performed best. Most configurational research has since adopted the earlier perspective that some organizational types will fit a given environment better than others. Importantly, this view does *not* assert that only one approach to a given environment can be successful. Each environment can contain several well-aligned configurations and several poorly aligned configurations.

Consequently, many studies have empirically examined configurations-performance relationships. Prior qualitative reviews have concluded that findings constitute overall "weak evidence of performance variations across groups" (Thomas & Venkatraman, 1988: 548). Barney and Hoskisson (1990) suggested abandoning configurational inquiry in favor of focusing on performance implications of firm-specific characteristics. Unfortunately, these qualitative reviews used a "voting" perspective (Hunter, Schmidt, & Jackson, 1982), concluding the configurations-performance relationship was equivocal because studies offering null results approximated the number reporting positive results (McGee & Thomas, 1986; Thomas & Venkatraman, 1988). Hunter and Schmidt (1990) demonstrated that merely counting studies that support or do not support a relationship often leads to erroneous conclusions. The strength of a relationship can only be accurately estimated across the studies in a literature through meta-analytic aggregation of effect sizes (Hunter et al., 1982; Hunter & Schmidt, 1990). Thus, meta-analytic evidence is needed before configurational inquiry is abandoned.

In addition, two substantive issues have been debated. The first is the adequacy of variables selected to identify configurations (Ketchen et al., 1993; McKelvey, 1982), and the second is whether sets of defining variables should be applied within an industry, technology, market, or nation (Bacharach, 1989). Research conducted from different perspectives has yielded profound differences in empirical results (Dess et al., 1993), making

qualitative assessment of configurations-performance links even more difficult. The hypotheses developed below focus on the presence of an overall configuration-performance relationship and potential moderators of that relationship.

In sum, the expectation that organizational configurations will vary in performance is based in contingency theory. According to contingency theory, firms whose configurations are aligned with their environment should perform better than firms in nonaligned configurations (Ketchen et al., 1993). Hence,

> *Hypothesis 1: As a group, extant studies reveal performance differences between organizational configurations.*

In addition, investigators must make important decisions regarding sample, variable selection, and method. Evidence suggests these decisions affect study outcomes (Russell et al., 1994). A first question regarding configuration identification centers on the choice between inductive and deductive theory. Those taking inductive approaches aim at exploratory classification of organizations (Ketchen & Shook, 1996), searching for performance differences between configurations. These approaches do not specify the number, characteristics, or performance strength of configurations. Deductive studies use a priori theory to specify the nature of configurations and expected performance outcomes (Ketchen et al., 1993).

The choice of an inductive or deductive approach is a hotly debated issue. Some have argued that clustering techniques driving many inductive studies capture chance relationships among variables to maximize configuration differences. Cluster analysis groups organizations by minimizing the multivariate distance between firms within group while maximizing the distance between groups (Hair, Anderson, Tatham, & Black, 1992), using *all* observed relationships among configuration-defining variables to assign firms to clusters. Barney and Hoskisson (1990) suggested organizational performance may differ across inductively derived configurations as a result of differences in configuration-defining variables that occur by chance or are in fact caused by performance. Little cumulative theory development surrounds any particular set of configurations—32 of the 40 configurations-performance estimates reported below define unique configurations. Absent strong a priori theory, configurations-performance relationships estimated using inductive procedures should be larger than estimates derived when configuration membership is determined deductively (Barney & Hoskisson, 1990). Thus,

> *Hypothesis 2: Studies using inductively derived configurations will report a stronger relationship (higher meta-analytic effect-size estimates) with performance than studies using deductively derived configurations.*

The scope of variables used to identify configurations has also been controversial. Building on classification theory in the biological sciences, McKelvey (1982) contrasted two general approaches to organization classification. Those taking the *essentialist* approach contend configuration members share a few central, narrowly defined attributes (Hatten & Hatten, 1985; Miller, 1988; Porter, 1979; Tremblay, 1985). The *empiricist* approach suggests many attributes must be examined to encompass organizations' fundamental complexity (Cool & Dierickx, 1993; Dess & Davis, 1984; Miller, 1981; Thomas & Venkatraman, 1988). If using broad sets of variables decreases error in classifying firms as configuration members (McKelvey, 1982), true underlying performance differences are more likely to be captured.

> *Hypothesis 3: Studies using broad sets of configurational variables will report a stronger configurations-performance relationship than studies using narrow sets.*

The second debate centers on whether configurations generalize across populations of organizations and time. Dess and colleagues (1993) and Thomas and Venkatraman (1988) argued that restricting samples to subpopulations (e.g., an industry) constrains configurations' predictive power by attenuating total performance variance. In fact, this is only true if sampling procedures obtain subpopulations with meaningfully truncated performance distributions (Bobko, 1995: 106–107). If performance is truly a function of configuration membership, observed relationships will be attenuated to the extent that representative samples of each subpopulation are not present. Sampling from multiple industries (or contexts) drastically increases the number of firms needed to obtain representative samples of all naturally occurring configurations within each context. Consequently,

> *Hypothesis 4: Studies using single-industry samples will report a stronger configurations-performance relationship than studies using multi-industry samples.*

Finally, Fiegenbaum and Thomas (1993) argued that configurations possess temporal stability occasionally punctuated by brief windows of membership or structural "revolution." If a cross-sectional design captures configurations during a revolution, noise in the form of measurement and sampling error will yield underestimates of configurations-performance relationships. Longitudinal designs should yield less biased estimates as sources of error average out over sequences of measures within firms (Miller, 1987; Tushman & Romanelli, 1985). Further, unless causal processes are instantaneous, only longitudinal designs will capture initial effects of configurational structure on subsequent performance (Dess et al., 1993; Hambrick, 1990; Ketchen et al., 1993; Zahra & Pearce, 1990). Hence,

> *Hypothesis 5: Studies using longitudinal designs will re-*
> *port stronger configurations-performance relationships*
> *than studies using cross-sectional designs.*

METHODS

Sample

All primary research articles in the *Academy of Management Journal,* annual *Academy of Management Proceedings, Administrative Science Quarterly, Management Science,* and *Strategic Management Journal* published between January 1972 and January 1995 were collected and coded for moderator variables, sample size, number of configurations, and effect size. We also searched two databases, the *Abstract of Business Information (ABI)* and *Dissertation Abstracts International,* and added studies by examining the reference sections of major qualitative reviews of the strategic groups literature (Barney & Hoskisson, 1990; McGee & Thomas, 1986; Thomas & Venkatraman, 1988). We sent authors located in this initial search letters requesting working papers, papers in press, and papers presented at academic conferences examining configurations-performance relationships.

Three strategic management doctoral students independently coded studies. Coders had 320 opportunities for disagreement in recording effect sizes, number of configurations, and sample size. Disagreement occurred 25 times, so the rate of initial coding agreement was 92 percent. Coding agreement was reached through discussion for these 25 cases. The first author also independently coded all studies, yielding three additional cases of disagreement that were discussed until mutual agreement was reached. The final sample consisted of 33 primary research studies containing 40 independent samples of organizations. Table 1 lists all articles in the meta-analysis and describes how they were coded.

Meta-Analytic Procedures

Meta-analyses reported below use Hunter and Schmidt's (1990) procedure to estimate the strength of the configurations-performance relationships found across 40 independent sample effect sizes. Hunter and Schmidt's procedures partition observed variance in effect sizes across studies into variance attributable to random sampling error and "residual" variance. Strong evidence of a moderator is present when meaningful differences in average effect size occur across levels of the moderator and residual variance in effect sizes decreases.

Some studies derived multiple "configurations" of organizations from the same sample and tested whether each set was related to performance outcomes. We averaged these effect sizes and counted them as one "study" (Hunter & Schmidt, 1990; Schmitt, Gooding, Noe, & Kirsch, 1984).

Eta ($\hat{\eta}$): The Estimate of Effect Size

In the studied research, ANOVA designs were typically used to test for performance differences between configurations. We transformed the re-

TABLE 1
Studies and Coded Information Used in Meta-Analysis

Studies	Basis of Configuration	Breadth of Variables	Sample Industry	Time Frame of Study
Porter, 1979	Deductive: Size	Narrow	Multi-industry	Cross-section
Snow & Hrebiniak, 1980	Deductive: Miles & Snow	Narrow	Multi-industry	Cross-section
Hambrick, 1983b	Deductive: Miles & Snow	Narrow	Multi-industry	Cross-section
Dess & Davis, 1984	Deductive: Porter	Broad	Paint & allied products	Cross-section
Hawes & Crittenden, 1984	Inductive	Broad	Retail grocery	Cross-section
Calori, 1985	Inductive	Broad	Multi-industry	Cross-section
Tremblay, 1985	Inductive	Narrow	Brewing	Longitudinal: 28 years
Cool & Schendel, 1987	Inductive	Broad	Pharmaceutical	Longitudinal: 20 years
Obaidat, 1987	Deductive: Porter	Broad	Multi-industry	Cross-section
Miller, 1988	Inductive	Narrow	Multi-industry	Cross-section
Namiki, 1988	Inductive	Broad	Computer hardware manufacturing	Cross-section
Robinson & Pearce, 1988	Inductive	Broad	Multi-industry	Longitudinal: 5 years
West, 1988	Deductive: Porter	Broad	Food service	Cross-section
Lawless, Bergh, & Wilsted, 1989	Inductive	Broad	Multi-industry	Cross-section
Lawless & Finch, 1989 (minimum choice environment)	Inductive	Broad	Multi-industry	Cross-section
Lawless & Finch, 1989 (differentiated choice environment)	Inductive	Broad	Multi-industry	Cross-section
Lawless & Finch, 1989 (maximum choice environment)	Inductive	Broad	Multi-industry	Cross-section
Lawless & Finch, 1989 (incremental choice environment)	Inductive	Broad	Multi-industry	Cross-section
Mascarenhas & Aaker, 1989	Deductive: Mobility barriers	Narrow	Oil drilling	Longitudinal: 10 years
Namiki, 1989	Deductive: Miles & Snow	Broad	Semiconductors	Cross-section
Smith, Guthrie, & Chen, 1989	Deductive: Miles & Snow	Broad	Electronics manufacturing	Cross-section
Barney & Hoskisson, 1990	Inductive	Broad	Food processing	Cross-section
Conant, Mokwa, & Varadarajan, 1990	Deductive: Miles & Snow	Broad	Health maintenance organizations	Cross-section
Fiegenbaum & Thomas, 1990	Inductive	Broad	Insurance	Longitudinal: 15 years
Lee & Yang, 1990	Deductive: Export strategy	Narrow	Multi-industry	Cross-section
Lewis & Thomas, 1990 (size)	Inductive	Narrow	Retail grocery	Cross-section
Lewis & Thomas, 1990 (strategy groups)	Inductive	Broad	Retail grocery	Cross-section
Lewis & Thomas, 1990 (factor groups)	Inductive	Broad	Retail grocery	Cross-section
Corsi, Grimm, Smith, & Smith, 1991	Inductive	Broad	Less-than-truckload motor carriers	Longitudinal: 10 years

TABLE 1 (continued)

Studies	Basis of Configuration	Breadth of Variables	Sample Industry	Time Frame of Study
Lawless & Tegarden, 1991 (conforming industries)	Inductive	Broad	Multi-industry	Cross-section
Lawless & Tegarden, 1991 (nonconforming industries)	Inductive	Broad	Multi-industry	Cross-section
Park, 1991	Inductive	Broad	Computer	Longitudinal: 14 years
Tallman, 1991	Inductive	Broad	Auto	Longitudinal: 12 years
Dowling & Ruefli, 1992	Inductive	Broad	Telecommunications equipment	Longitudinal: 12 years
Tehrani, 1992	Deductive	Broad	Multi-industry	Cross-section
Cool & Dierickx, 1993	Inductive	Broad	Pharmaceuticals corporations	Longitudinal: 20 years
Ketchen, Thomas, & Snow, 1993	Inductive	Broad	Health care facilities	Longitudinal: 5 years
Ketchen, Thomas, & Snow, 1993	Deductive: Zammuto, 1988	Broad	Health care facilities	Longitudinal: 5 years
Reger & Huff, 1993	Inductive	Broad	Banking	Cross-section
Gales & Kamath, 1994	Inductive	Narrow	Insurance	Cross-section

ported F-statistics into estimates of $\hat{\eta}^2$, or the percentage of total performance variance explained by variance between configuration group means (Maxwell, Camp, & Arvey, 1981; Reynolds, 1977). The "true" population parameter being estimated by $\hat{\eta}^2$, commonly called the proportionate reduction in error (PRE; cf. Reynolds, 1977), is:

$$PRE = \frac{\sigma_y^2 - \sigma_e^2}{\sigma_y^2}.$$

The formula for $\hat{\eta}^2$ is:

$$\hat{\eta}^2 = \frac{\dfrac{SS_{total}}{N} - \dfrac{SS_{within}}{N}}{\dfrac{SS_{total}}{N}}.$$

"Standardized" estimates called omega ($\hat{\omega}$), using estimates of sums of squares, mean squares, and a correction for degrees of freedom (Hayes, 1963: 382), were derived from information reported in each study (only Calori [1985] directly reported $\hat{\omega}^2$ results). The formula was:

$$\hat{\omega}^2 = \frac{SS_{between} - (J-1)MS_{within}}{SS_{total} + MS_{within}}.$$

F-statistics reported in each study tested the null hypothesis that performance outcomes differed across configurations. Dividing $MS_{between}$ by MS_{within} yielded these Fs; thus, with knowledge of the number of configurations (J) and sample size (N_j), we could use a simple arithmetic transformation to generate standardized estimates of $\hat{\omega}$ for each study. We used formulas from Hunter and Schmidt (1990) to meta-analytically estimate population values of $\hat{\omega}$ and observed variance in $\hat{\omega}$ $(\sigma_{\hat{\omega}}^2)$. Variance due to sampling error $(\sigma_e^2$ or $SE_\eta)$ was derived from a program developed by Hunter (no formula exists for SE_η because of different noncentral F-distributions associated with each ω), and residual variance attributed to true differences across situations (σ_ω^2) was derived by subtracting σ_e^2 from observed variance in $\hat{\omega}$ $(\sigma_{\hat{\omega}}^2)$. Estimates for ω were derived from the 40 effect sizes and for effect-size subgroups corresponding with each moderator level.

RESULTS

Table 2 presents meta-analytic results. The average effect size $(\hat{\omega})$ across all studies was estimated to be .276, indicating the best estimate of variance explained in performance across all studies is $.276^2$, or approximately 8 percent. Note that $\hat{\omega}$ and not $\hat{\omega}^2$ is linearly related to the utility of strategic decisions to change configurations; the value of .276 suggests that organizational configurations account for approximately 28 percent of the utility available if one could perfectly predict differences in firm performance. Thus, there was support for Hypothesis 1.

We also derived simple correlations between the moderator variables examined in Hypotheses 2–5. Results suggest codings of studies as inductive/deductive, narrow/broad, single/multi-industry, and longitudinal/cross-sectional tended to be uncorrelated, though multi-industry studies were more likely to be cross-sectional $(r = -.45$ between single/multi-industry and longitudinal/cross-sectional codings, $p < .001]$. Hence, tests of Hypotheses 4 and 5 are not independent of one another as significant differences in effect sizes may be a result of single versus multiple industry status, use of longitudinal versus cross-sectional designs, or both.

Hypothesis 2 predicts the average effect sizes found for studies using inductively derived configurations will be higher than those found for studies using deductively derived configurations. With $\hat{\omega}$ equal to .273 for inductive configurations and .278 for deductive configurations $(p > .05)$, no difference is indicated. Hypothesis 3, predicting broadly defined organizational configurations will yield stronger effect sizes than narrowly defined configurations, was supported: $\hat{\omega}$ is .356 and .169 for broadly and narrowly defined configurations, respectively $(p < .05)$. Studies focusing on a single industry had larger effect sizes $(\hat{\omega} = .327$ and .251, $p < .05$, for single and multiple industries, respectively), supporting Hypothesis 4. Finally, longitudinal studies demonstrated larger effect sizes $(\hat{\omega} = .349)$ than cross-sectional studies $(\hat{\omega} = .260, p < .05)$, supporting Hypothesis 5.

TABLE 2
Average of Total and Moderated Omega Coefficients[a]

Variables	Number of Omegas	Sample Range	Sample Total	$\bar{\omega}$	$\sigma^2_{\hat{\omega}}$	σ^2_e	σ^2_ω[b]	Percentage of Total Variance Due to Sampling Error
Total effect sizes	40	7–850	4,410	.276	.02868	.06643	—	232
Inductively derived	26	7–792	2,198	.273	.03317	.07593	—	228
Deductively derived	14	19–850	2,214	.278	.02422	.05701	—	235
Narrow definition of strategy	8	16–850	1,903	.169	.00840	.04134	—	492
Broad definition of strategy	32	7–303	25,077	.356	.02902	.08547	—	294
Cross-sectional designs	28	7–850	3,624	.260	.02719	.06095	—	224
Longitudinal designs	12	16–260	788	.349	.02899	.09170	—	316
Single-industry	23	16–260	1,405	.327	.03184	.09442	—	297
Multi-industry	17	7–850	3,005	.251	.02537	.05334	—	210

[a] Note that $\sigma^2_{\hat{\omega}}$ = variance in observed values of $\hat{\omega}$, σ^2_e = portion of variance in observed values of ω that is due to sampling error, and σ^2_ω = residual true variance ($\sigma^2_{\hat{\omega}} - \sigma^2_e = \sigma^2_\omega$) in ω after correction for sampling error.

[b] For many meta-analyses, the expected level of variance in effect sizes due to random sampling error is greater than the actual observed variance in effect sizes. When investigators subtract expected variance due to random sampling error from observed variance in effect sizes, a "negative" residual variance results, and they are left with a negative squared variable to report. An alternative convention has been adopted in meta-analysis reporting—the dash shown here.

DISCUSSION AND CONCLUSION

The results remove any equivocality surrounding configurations' ability to predict performance. On the basis of the estimate of overall performance effects attributable to configurations ($\hat{\omega}$ = .276), 27.6 percent of the utility available from prediction of performance differences across firms is predicted by configuration membership in this sample. The current meta-analytic findings more accurately depict the configurations-performance relationships reported in the literature than have previous qualitative reviews, which have been unable to account for sampling error across studies (Hunter et al., 1982).

The only hypothesized moderator not supported involved inductive versus deductive configuration origins. Research using inductively derived and theory-based, deductively derived configurations explained essentially equal amounts of performance variance. One unfortunate limitation of meta-analysis is its inability to detect moderator processes, although it can detect moderator effects (Russell & Gilliland, 1995). Similar effect sizes for inductively and deductively derived configurations suggest the variables used to define configurations are probably not deficient—investigators have selected well. They must now determine what latent processes operating among these variables causally influence performance outcomes. The deductive configurations investigated here recorded an $\hat{\omega}$ of .278 and, therefore, hold great promise (Schwab, 1980). Replicating findings for extant deductive configurations is a necessary first step toward understanding the boundaries and comparative strengths of competing configurational theories. A strong theory of organizational configurations will specify latent causal processes influencing firm performance and receive support when it predicts organizational performance more accurately than configurations derived inductively; $\hat{\omega}$ equal to .273 will be an important standard for future deductive efforts.

Curiously, no study in the sample examined whether inductively or deductively derived configurations incrementally increased the other's predictive power. Inductive and deductive approaches might predict nonoverlapping aspects of the performance domain; using them together might increase criterion-related validity. Again, $\hat{\omega}$ of .273 would be used as a benchmark.

The presence of moderator effects suggests directions for future efforts. Results indicated configurations based on broad sets of organizational dimensions have larger effect sizes. Post hoc analyses suggested studies using broad definitions yielded significantly more configurations (χ^2 = 9.89, $p <$ .05). Broad sets of variables may permit finer calibration of configuration measures, yielding more construct validity than coarsely calibrated studies based on narrow sets of variables (Russell & Bobko, 1992). If the "true" number of configurations in a population is large, broad variable sets may provide more accurate measures of latent configuration structure and performance relationships.

Results also suggested studies focusing on a single industry had larger

effect sizes. Configurations may be most useful as an intraindustry concept, in theorizing strategic groups, for instance. Future applications of multi-industry designs should carefully control for the role of industry.

Studies using longitudinal designs reported larger effect sizes. Although limits on data, time, and money often constrain investigators' ability to conduct longitudinal research (Summer et al., 1990), this finding suggests longitudinal designs should significantly enhance the criterion-related validity of configurational research. Conclusions drawn from tests of Hypotheses 4 and 5 should be considered tentative because studies' use of single or multiple industries was moderately confounded with studies' use of longitudinal or cross-sectional designs. Additional primary research examining multiple industries in longitudinal designs (current $N = 786$) should clarify these effects.

The need for programmatic configurational research is apparent. These results constitute an important contribution by demonstrating that observed variation in configurations-performance relations across studies is largely due to random sampling error: configurations are important predictors of firm performance, and conclusions drawn by qualitative reviews have been inaccurate. Unfortunately, the current findings were not able to address the merits of any one configurational theory. Before this literature can offer managerial implications, future researchers need to programmatically (1) replicate existing configurations-performance relationships in multiple contexts, (2) examine ways to integrate and extend configurational theories, and (3) develop critical tests of competing predictions made by alternative models.

Replication is important to determine the degree of generalizability and extant boundary conditions on performance prediction. Although use of meta-analysis controls for expected sampling error in estimating effect size, inferences are necessarily limited by the quality, breadth, and depth of studies contributing to the meta-analysis (Sackett, Tenopyr, Schmitt, & Kehoe, 1987). Systematic replication and extension (i.e., programmatic research) would establish not only the magnitude of the configurations-performance relationship (the overall effect size) but also the specific nature of the link (why some groups perform better than others and under what conditions) through sequences of critical tests of competing explanations. Unfortunately, we could find only five studies that examined a single profile of configurations with independent data sets: Conant, Mokwa, and Varadarajan (1990), Hambrick (1983), Namiki (1989), Smith, Guthrie, and Chen, 1989, and Snow and Hrebiniak (1980) all examined the Miles and Snow (1978) typology. Three studies examined Porter's (1980) model. No two of the remaining effect sizes were based on common configurations.

Second, the number of competing theories and models should be reduced through conceptual comparisons and integration. Future investigators should engage in theory reduction by identifying commonalities among configurations and testing competing predictions. Some progress was made in this direction when Segev (1989) demonstrated parallels between Porter's (1980) model of generic strategy and the Miles and Snow (1978) typology.

The current results suggest configurational research provides a technology for explaining performance, though performance explanation will be limited until there is greater integration of existing theory.

Longer-term, critical tests of configurational models' competing predictions will have a profound effect on theory development (McGrath, 1964). By investigating competing predictions using samples drawn from the same population or populations, investigators will begin to discover the relative strengths of alternative configurational theories. In two examples, Doty, Glick, and Huber (1993) demonstrated some advantages of Miles and Snow's (1978) typology over Mintzberg's (1979) typology, and Ketchen and colleagues (1993) found Zammuto's (1988) classification model to be more effective than inductive configuration methods. By continuing critical tests such as these, the number of competing models can be reduced, and research attention can be focused on the most promising configurational theories.

Finally, reporting practices hindered examination of the configurations-performance relationship and need to be revised. For example, studies rarely reported information regarding diversification status. Although researchers usually classify firms at the business level, performance data are often reported at the corporate level. Given this potential confound, we attempted to code whether sampled firms were single or multibusiness but quickly discovered that very few studies offered sufficient information. For example, Ketchen and colleagues (1993) examined hospitals, failing to distinguish those involved in peripheral businesses such as hospital supply, laboratories, and even off-site parking garages from those without such businesses. More broadly, the environmental conditions (for instance, Dess and Beard's [1984] dynamism, complexity, and munificence) confronting sampled organizations were rarely described.

Where will configurations research be after programmatic efforts yield another 40 estimates of configurations-performance effects? Hopefully, a relatively small number of competing configurations-performance models will have evolved, each characterized by a meaningful number of supportive empirical studies. Application of meta-analytic procedures to this expanded literature will, again, decrease the sampling error haze through which individual effect sizes are necessarily viewed. To the extent that researchers replicate prior research, consolidate configurational models, and perform critical tests of competing predictions, meta-analysis of this larger literature will permit strong theoretical inferences. Ideally, these results will guide managers as to what configuration to adopt under particular environmental conditions. Given the relative youth of the existing research, the reported meta-analytic results permit more limited conclusions: configurations are related to organizational performance, and a number of organizational, environmental, and study characteristics covary with that relationship.

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Submit six copies of your manuscript; be sure that they are good, clear copies and that each copy includes all pages. There is no absolute limit, but the length of articles should not ordinarily exceed 30 manuscript pages, including references, appendixes, tables, and figures. Either double- or single-sided copying is acceptable. However, the title page, abstract page, footnote pages, references, appendixes, tables, and figures should be single-sided. The body of the article can be double-sided.

The manuscript should be typed on either letter (8.5″ × 11″) or A4 (8.27″ × 11.69″) paper in a 12-pitch or larger font. *Double-space all material,* including footnotes, references, appendixes, tables, and figures. Use wide margins—one inch or more—at the top and bottom and on the left and right of all pages.

Title Page, Abstract, and Page Numbering

The first page of the manuscript is the title page and should be numbered "1." It should include the title of the article (typed in all capital letters), the authors' names (all capitals), and their affiliations, addresses, and contact numbers (initial caps only). Example:

CROSSING CULTURAL ISSUES IN ORGANIZATIONAL STUDIES

ANNE S. TSUI
Department of Management of Organizations
Hong Kong University of Science and Technology
Clear Water Bay, Hong Kong
Tel: (852) 2358-7727
Fax: (852) 2335-5325
e-mail: mnastsui@usthk.ust.hk

An abstract of 75 words or less and the title of the article should appear on page 2. The body of the article begins on page 3. Page numbering should continue through all pages, including those with footnotes, references, appendixes, tables, and figures. Group these, in the order just given, on separate pages at the end of the article.

Acknowledgments

An unnumbered footnote can be used to acknowledge financial support and the assistance of others in the reported research. The text for this footnote should appear at the bottom of page 1.

Headings

Main headings should be used to designate the major sections of an article; three or four main headings should be sufficient for most articles. Initial headings, such as "Introduction," are unnecessary. Main headings should be centered on the page and typed in all capitals. Example:

<div align="center">METHODS</div>

Secondary headings should be typed flush with the left margin and in small letters, with major words beginning with capitals. Example:

Data and Sample

Third-order or *paragraph headings* should begin with a standard paragraph indention and be typed in small letters, with only the initial word capitalized, and followed by a period. The text should follow on the same line. Example:

Manager sample. Respondents consisted of a random sample of 300 managers....

Tables and Figures

Useful tables and figures do not duplicate the text; they supplement and clarify it. Because tables and figures are considerably more expensive to prepare for publication than text, the degree to which they add to the impact of an article should be considered carefully.

Type each *table,* double-spaced, on a separate page. Group tables after appendixes. (If there is no appendix, tables follow the references.) Each table should have the word TABLE (typed in all caps) and its number (arabic numerals) centered at the top. The table's title should be in capital and small letters and centered on the page directly under the table number. Example:

<div align="center">TABLE 2
Results of Regression Analysis</div>

Number tables consecutively from the beginning to the end of the article. Indicate each table's position in the text as follows:

<div align="center">Insert Table 2 about here</div>

For most articles, the first table should report descriptive statistics, including means, standard deviations, and a complete correlation matrix. These statistics should have two decimal places and decimal points. Correlations should fill the lower left corner of the page.

Each table should report the results of one type of analysis. Headings should be ranged across the top of the table. No new headings should appear in the body of the table. Use complete names of variables—not abbreviations or computer code names.

Statistics should have only two decimal places. If it is necessary to distinguish some numerals in a table from others (for example, to indicate

which factor loadings define a factor), boldface type can be used. This possibility should not be used when other conventions, such as footnotes, are sufficient.

Footnotes to tables are of two types:

(1) General footnotes that explain the table as a whole, columns or rows, or individual items. Designate these with superscript small letters [a,b,c].

(2) Footnotes that indicate a level of significance. These should follow any other footnotes and be designated by one or more asterisks: * for $p < .05$, ** for $p < .01$, and *** for $p < .001$. Use a dagger symbol (†) for $p < .10$.

Figures are illustrations, not tables. Supply finished, camera-ready artwork for all figures.The spacing and lettering used in figures should allow for the possibility that they will be reduced in size by as much as 50 percent so that they will fit the size of the *Journal's* page. Figures should be numbered and titled like tables (see above) and grouped after the tables in the manuscript. Indicate each figure's position in the article in the same way as each table's position.

Footnotes

Footnotes should be used sparingly. Minimize their use for parenthetical discussion; material that is pertinent can often be integrated into the text. They should not be used for citing references (see the sections Citations and References, below). The text for all footnotes should appear on a separate page or pages at the end of the body of the article, before the references.

Citations

Giving proper credit to sources of original ideas and previous work is an important aspect of good scholarship. Inappropriate or inaccurate citations do not do justice to the authors cited and can be misleading to readers.

A tendency and a desire to cite one's own previous or current work is understandable. However, excessive use of self-citations is more distracting than useful. When submitting your manuscript for publication consideration, use self-citations cautiously. Minimize references that would reveal the manuscript's authorship. Doing this is important for protecting the double-blind review process of the *Academy of Management Journal.*

Citations should be made in the text by enclosing the cited authors' names and the year of the work cited in parenthese. Example:

Several studies (Adams, 1974; Brown & Hales, 1975, 1980; Collins, 1976a, 1976b) support this conclusion.

Please note the use of alphabetical order and ampersands. Also note that two or more works by the same author (or by an identical group of authors) published in the same year are distinguished by "a," "b," etc. added after the year.

Citations to the source of a direct quotation must give a page number or numbers; these follow the date of publication and are separated from it by a colon. Example:

Adams has said that writing a book is "a long and arduous task" (1974: 3).

Page numbers should also be cited when specific arguments or findings of authors are paraphrased or summarized.

If a work has two authors, give both names every time the work is cited in the text. If a work has more than two authors, give all authors the first time it is cited in subsequent citations, include only the name of the first author, "et al.," and the year. Examples:

Few field studies use random assignment (Franz, Johnson, & Schmidt, 1976).

(first citation)

. . . even when random assignment is not possible (Franz et al., 1976: 23).

(subsequent citation)

However, for works with six or more authors, use only the name of the first author and "et al." whenever the work is cited.

References

An alphabetically ordered list of the works cited in the text—the references—should be included at the end of an article. References should begin on a separate page headed REFERENCES. Continue the pagination.

Entries in the list of references should be alphabetized by the last name of the author (first author if more than one) or editor, or by the corporate author (U.S. Census Bureau) or periodical name *(Wall Street Journal)* if there is no indication of individual authors or editors. Several references by an identical author (or group of authors) are ordered by year of publication, with the earliest listed first. If the year of publication is also the same, differentiate references by adding small letters ("a," "b," etc.) after the year. Authors' names are repeated for each entry in the reference list.

Book entries in the list of references follow this form: Authors' or Editors' Last Names, Initials. Year. Title of book. (Book titles are underlined and typed in lowercase letters except for the first letter of the first word and the first word after a colon.) City Where Published, State or Country (add only if needed to identify the city and use U.S. Postal Service abbreviations for states): Name of Publisher. Please note and follow the punctuation used in these and subsequent examples:

Boulding, K. E. 1956. The image. Ann Arbor: University of Michigan Press.
Kahn, R. L., & Boulding, E. (Eds.). 1964. Power and conflict in organizations. Glencoe, IL: Free Press.
Katz, D., & Kahn, R. L. 1978. The social psychology of organizations (2nd ed.). New York: Wiley.
U.S. Department of Labor Statistics. 1976–83. Employment and earnings. Washington, DC: U.S. Government Printing Office.

Periodical entries follow this form: Authors' Last Names, Initials. Year. Title of article or paper (in lowercase letters except for the first letter of the first word and the first word after a colon). Name of Periodical, volume number (issue number): page numbers. Examples:

Fry, L. W., & Slocum, J. W., Jr. 1984. Technology, structure, and workgroup effectiveness: A test of a contingency model. Academy of Management Journal, 27: 221–246.

Goggin, W. C. 1974. How the multidimensional structure works at Dow Corning. Harvard Business Review, 55(1): 54–65.

Include an issue number *only* if a periodical's pages are not numbered consecutively throughout its volumes—that is, if each issue begins with a page numbered "1."

If a periodical article has no author, treat the name of the periodical like a corporate author, in both citations and references. Example:

There is fear that Social Security rates may rise (Wall Street Journal, 1984).

Wall Street Journal. 1984. Inflation rate may cause Social Security increase. September 24: 14.

Chapters in books follow this form: Authors' Last Names, Initials. Year. Title of chapter (in lowercase letters except for the first letter of the first word and first word after a colon). In Editors' Initials and Last Names (Eds.), Title of book: page numbers. City Where Published, State or Country (only if necessary to identify the city): Name of Publisher. Examples:

Berg, N. A. 1973. Corporate role in diversified companies. In B. Taylor & I. MacMillan (Eds.), Business policy: Teaching and research: 298–347. New York: Wiley.

Roberts, F. S. 1976. Strategy for the energy crisis: The case of commuter transportation policy. In R. Axelrod (Ed.), Structure of decision: 142–179. Princeton, NJ: Princeton University Press.

Unpublished papers, dissertations, and presented papers should be listed in the references using the following formats:

Duncan, R. G. 1971. Multiple decision-making structures in adapting to environmental uncertainty. Working paper no. 54–71, Northwestern University Graduate School of Management, Evanston, IL.

Smith, M. H. 1980. A multidimensional approach to individual differences in empathy. Unpublished doctoral dissertation, University of Texas, Austin.

Wall, J. P. 1983. Work and nonwork correlates of the career plateau. Paper presented at the annual meeting of the Academy of Management, Dallas.

Appendixes

Present lengthy but essential methodological details, such as explanations of the calculation of measures, in an appendix or appendixes. The material should be in as condensed a form as possible but not in a table format. Entitle a single appendix APPENDIX, typed in all caps; multiple appendixes are titled and ordered alphabetically: APPENDIX A, APPENDIX B, etc.

Biographical Sketches

At the time your article is accepted for publication, please submit a brief biographical sketch of 50 words or less for each author. It should indicate

where the highest degree was earned, present position and affiliation, and current research interests. Example:

Andrea Barber earned her Ph.D. degree at the University of Wisconsin; she is an associate professor of management and the director of the Management Improvement Center at Famous University. Her current research interests include dual-career families and sociotechnical systems in organizations.

RESEARCH NOTES

Research notes contain brief descriptions of original research. To be considered for the Research Notes section, a manuscript should not exceed 20 double-spaced typewritten pages in length. Prepare manuscripts intended for this section according to the instructions for articles. However, the abstract should not exceed 50 words.

GENERAL USAGE

Avoidance of Sexist and Other Biased Language

Authors should avoid terms or usages that are denigrating to ethnic or other groups or may be interpreted as such. Be particularly careful in dealing with gender, where long-established customs, such as the use of "he" as a generic pronoun ("a manager . . . he"), can imply gender-based discrimination. Using plural pronouns—changing the "client . . . he" to "clients . . . they"—is preferred.

Use of First Person and Active Voice

Vigorous, direct, clear, and concise communication should be the objective of all articles. Use of the first person and the active voice can further that objective. Examples:

Two of the four items were also found to lack factor validity by Earley (1989). [passive]
Earley (1989) also found that two of the four items lacked factor validity. [active]

Three new items were developed. [passive]
We developed three new items. [active, first person]

CONCLUSION

Please pay careful attention to the details of this journal's style set forth in this guide when making your submissions. Your adherence to *AMJ*'s guidelines will smooth and expedite the review, editing, and publication processes.

PAST EDITORS

Paul M. Dauten, Jr., *University of Illinois*	1958–60
Dalton E. McFarland, *Michigan State University*	1961–63
Paul J. Gordon, *Indiana University*	1964–66
Stanley C. Vance, *University of Oregon*	1967–69
William G. Scott, *University of Washington*	1970–72
John B. Miner, *Georgia State University*	1973–75
Larry L. Cummings, *University of Wisconsin–Madison*	1976–78
John W. Slocum, Jr., *Southern Methodist University*	1979–81
Thomas A. Mahoney, *Vanderbilt University*	1982–84
Janice M. Beyer, *New York University*	1985–87
Richard T. Mowday, *University of Oregon*	1988–90
Michael A. Hitt, *Texas A&M University*	1991–93
Angelo S. DeNisi, *Rutgers University*	1994–96

Call for Papers

1997 PDMA INTERNATIONAL CONFERENCE
and a Special Issue of the
Journal of Product Innovation Management

The Product Development & Management Association (PDMA) will be holding its 1997 International Research Conference from Saturday, October 18, through Wednesday, October 22, at the Doubletree Hotel, in Monterey, California. All competitive sessions will be held Sunday and Monday, October 19 and 20, and will consist of presentations of papers that have been accepted following a double-blind review process.

PDMA welcomes papers from academics, industry representatives, and service providers on current product development research, particularly as it applies to the theme, "maximizing return on product development: challenges and opportunities." Conceptual, review, and especially empirical papers pertaining to product development, new product marketing, and innovation management are sought for presentation at the conference. The Conference Chair will identify the most outstanding research papers presented. Authors of identified papers will be encouraged, but not required, to submit their papers for review for inclusion in a special issue of the *Journal of Product Innovation Management.*

The deadline for submission is March 20, 1997. Notification of acceptance will be made on or before June 1, 1997. All final copies of accepted papers and abstracts must be received by the Research Conference Proceedings Editor by August 1, 1997.

Submission Guidelines

- Submit four (4) double-spaced typed copies of your manuscript to

<div align="center">

L.W. (Bill) Murray, Ph.D., Chair
Research Program, 1997 PDMA Conference
University of San Francisco
McLaren School of Business
San Francisco, CA 94117-1080
(415) 422 6519; FAX (415) 422 2502
e-mail: murray@usfca.edu

</div>

- Manuscripts must follow the style guidelines of the *Journal of Product Innovation Management (JPIM)*. Manuscripts should not exceed twenty (20) pages total, including tables, figures, and references. Please submit a 3 x 5 index card with the name of the manuscript, the name(s) of the author(s), and the address and telephone number of a contact person.

- Please do not identify yourself on any page of the manuscript other than the title page. All manuscripts will be double-blind reviewed. Submission of a manuscript for review indicates that it or a similar version has not been previously published or is simultaneously under review elsewhere.

- A proceedings of the 1997 PDMA International Research Conference will be prepared and made available at the conference. Papers published in the proceedings may still be considered for subsequent publication in *JPIM.*

- At least one author of an accepted paper must actually register for the Research Conference session.

CALL FOR AWARD NOMINATIONS

The Organizational Behavior Division of the Academy of Management announces its annual call for nominations for its Outstanding Publication in Organizational Behavior Award. The award will be presented to the author or authors of a publication appearing during the 1996 calendar year in a recognized outlet generally available to Division members. The Outstanding Publication in Organizational Behavior Award is given for the most significant contribution to the advancement of the field of organizational behavior. Recipients of the award need not belong to the Academy of Management.

Each Academy of Management member may nominate one publication for the award, but no member may nominate more than one publication. Nomination should be made in writing and must include: (a) a rationale justifying receipt of the award by the nominee(s) and (b) a full bibliographic citation of the nominated work. Self-nominations will not be accepted.

To receive consideration, material must be postmarked no later than March 31, 1997. The recipient of the award will be announced at the August 1997 Academy meeting during the OB Division's business meeting, where a certificate of recognition will be presented. All nominations should be sent to Dr. Ruth Kanfer, Department of Psychology, N478 Elliott Hall, University of Minnesota, 75 East River Road, Minneapolis, MN 55455.

R·I·T

BENJAMIN FORMAN CHAIR IN INTERNATIONAL BUSINESS
ROCHESTER INSTITUTE OF TECHNOLOGY

The College of Business of the Rochester Institute of Technology seeks an accomplished teacher and scholar to occupy the Benjamin Forman Chair in International Business. The Chairholder will normally teach three classes per year and pursue an active research agenda.

In addition, the Chairholder will serve as Director of the Center for International Business. The director represents the Center to its constituents and leads these efforts:

• Maintain and enhance the International Business undergraduate and graduate credit programs, noncredit executive programs, and workshops for the campus community.
• Develop educational and research partnerships with funding sources, businesses, universities, and other organizations in the U.S.A. and abroad.

Candidates are expected to possess the following qualifications:

• A distinguished record of teaching and research in international business.
• Proven ability to work with the local and global business community and other Center constituents.
• Professional accomplishments sufficient to merit appointment as a tenured full professor of distinction.
• An earned doctorate from an accredited institution or equivalent experience in business or government.

The Rochester Institute of Technology is a private university of seven colleges with 14,000 students. The College of Business has 700 undergraduate and 500 graduate students. The Benjamin Forman Chair in International Business was established in 1988 to foster high-quality teaching and research in international business. The position is available for the 1997–98 academic year and thereafter. Nominations and applications will be accepted until the position is filled. Address nominations, applications, and inquiries to Benjamin Forman Chair Search Committee, Office of the Dean, College of Business, Rochester Institute of Technology, 107 Lomb Memorial Drive, Rochester, New York 14623-5608.

RIT is an EEO Employer and encourages applications from minorities and women.

Academy of Management Annual Meeting 1997

Boston, Massachusetts
August 10–13, 1997

Preconvention Activities: August 8–10
Regular Meeting: August 10–13

Theme: Current Issues That Call for Action

You don't want to miss out on what will surely be an exciting meeting taking place in Boston this year! This historic site offers so many tourism options you may feel the need to stay an extra week just to see everything Boston has to offer. In addition to the many sessions, symposia, and exhibits occurring during meeting hours, the Local Arrangements Committee has scheduled the largest array of exciting social activities to give you the most out of your stay. See the Leonardo da Vinci exhibit or go whale watching in Boston Harbor, take a walking tour of Boston, or take the family on one of the exciting day trips to places like Newport or Marblehead (just to name a few!).

But to do any of this you must register first! Registration materials are available and will be included in the March 1997 edition of the *Academy of Management Newsletter*. To obtain your registration form and information guide, contact the Academy of Management at (914) 923-2607 or via the web site at www.aom.pace.edu or E-mail at aom@academy.pace.edu.

The Academy of Management

JOURNAL

Special Research Forum on Alliances and Networks

Academy of Management JOURNAL

EDITORIAL BOARD

INFORMATION FOR CONTRIBUTORS

The *Academy of Management Journal* publishes articles ·in fields of interest to members of the Academy of Management. These fields of interest are reflected in the divisions and interest groups listed on the inside front cover of the *Journal.*

The *Journal* publishes only original, empirical research as articles or research notes. Purely theoretical articles are published by the *Academy of Management Review.* Papers that are primarily applied in focus and that have managers as an intended audience should be submitted to the *Academy of Management Executive.*

In its articles, the *Journal* seeks to publish work that develops, tests, or advances management theory, research, and practice. Articles should have well-articulated and strong theoretical foundations. All types of empirical methods—quantitative, qualitative, or combinations—are acceptable. Exploratory survey research lacking a strong theoretical foundation, methodological studies, replications and extensions of past research, and commentaries with new empirical content are also of interest for publication as research notes if they make an important contribution to knowledge relevant to management. In addition, responses to or comments on articles previously published in the *Journal* may also be appropriate as research notes if they make an independent contribution to the literature.

Articles and research notes should be written so they are understandable and interesting to all members of the Academy. The contributions of specialized research to general management theory and practice should be made evident. Specialized argot and jargon should be translated into terminology in general use within the fields of management. Articles should also be written as concisely as possible without sacrificing meaningfulness or clarity of presentation. To save space, tables should be combined and data should be presented in the text wherever possible.

Manuscripts are considered for publication with the understanding that their contents have not been published and are not under consideration elsewhere. Manscripts should be prepared in accordance with the *Journal's* "Style Guide for Authors," which is published in the February issue and is also available from the managing editor. Contributors should submit six copies of their papers, retaining the original for their files. The *Journal* does not return manuscripts unless requested to do so.

Manuscripts submitted for publication as articles should not ordinarily exceed 30 double-spaced typewritten pages, including tables. Manuscripts submitted as research notes should not exceed 20 double-spaced typewritten pages, including tables. Everything in submitted manuscripts should be typed in double-spaced format in a 12-pitch or larger font. Please consult the "Style Guide for Authors" for further details of manuscript preparation.

Decisions regarding the publication of submitted manuscripts are based on the recommendation of members of the *Journal's* editorial board or that of other qualified reviewers. All articles and research notes published in the *Journal* are subject to a blind review process. Obvious self-citations that make known an author's identity should be avoided whenever possible. Reviewers evaluate manuscripts on their significance to the field, conceptual adequacy, technical adequacy, appropriateness of content, and clarity of presentation. Reviewers' comments are made available to authors.

Submissions should be sent to Anne S. Tsui, Editor, % Carolyn Haitsch, Managing Editor, *Academy of Management Journal,* 861 Bedford Rd., Pleasantville, NY, 10570-2799.

Academy of Management
JOURNAL

CONTENTS
Volume 40, Number 2, April 1997

FROM THE EDITOR

As I am finishing up the final touches on my second issue as editor, I am also feeling rather sad about the fact that the *Journal* has been unduly delayed because of a system crash experienced by the Sheridan Press (our printer) at the end of last year. Normally, you can expect the *Journal* to appear in your mailbox within two weeks of the appropriate month for each issue. The February 1997 issue was delayed for over a month, and there is some delay in this issue as well. Even though Sheridan Press has issued a letter of apology, which you should have received in early February 1997, the delay still is a disappointment and source of frustration. Everyone has been working hard to correct the situation. We hope that we will be caught up and back on our regular schedule by the next issue. We thank you for your understanding and patience. We apologize for the inconvenience caused to our diligent readers, and of course to our anxious authors, who deserve to have their work appear on time.

The system crash at Sheridan made me nervous about our reliance on the electronic media. However, the reality is that the electronic age is upon us and we at *AMJ* would like to take advantage of the opportunities this technology offers. *AMJ* is considering a variety of alternatives associated with electronic publishing. These could include authors' submitting manuscripts on-line, reviewing and editing on-line, and authors' submitting final edited manuscripts on-line or on disk. These changes could shorten the review cycle and the publication process and, best of all, could save many trees! Clearly, we will not do everything at once but will take a cautious, thoughtful approach. During the transition stage, we will most likely be asking authors to submit their manuscripts both on disk and as hard copy. Please watch for further communication on these exciting developments in future issues of the *Journal*.

Now a few words about this particular issue. As you will see, the entire issue is devoted to the Special Research Forum on Alliances and Networks. This forum was initiated over two years ago by guest co-editors Dick Osborn and John Hagedoorn. Dick is from the United States, and John is from the Netherlands. The forum is a fine example of U.S.-European collaboration, in terms of both editorship and authorship. My hope is that this particular issue will offer a glimpse into the future of *AMJ* in terms of one important future direction for the journal, international representation of both authors and scholarship.

The special research forums serve the important purpose of generating and encouraging new research ideas. We will have several research forums appearing in future issues that were initiated and developed under the editor-

ship of Angelo DeNisi. In this issue, you will see calls for papers for two **NEW** special research forums. One forum is **International Entrepreneurship,** and the other is **Stakeholders, Social Responsibility, and Performance.** Please be sure to read these calls for papers and see if any of your current work might fit either or both of these forums. We welcome more new ideas and new topics. If you have an idea for a special forum, no matter how wild or unformed it may seem to you, please bring it forward. Creative ideas often come from what seem like unusual, unconventional, or fuzzy thoughts at the start.

The *AMJ* staff welcomes your ideas, feedback, and suggestions at any time. Please let us know how we are doing and what we can do to improve our service to you as readers and authors. You can reach us easily by e-mail at amj@usthk.ust.hk or by fax at 852-2705-9562.

Anne S. Tsui
Hong Kong

Erratum: An error appeared on page 1538 of the December 1996 issue of *AMJ*. Talya Bauer's name is misspelled under the title of her article. We apologize for this error to our readers and, especially, to this author.

MESSAGE FROM ANGELO DeNISI

It is tradition with *AMJ* to provide statistics on submissions, revisions, acceptances, and review times. Below are the final summary statistics on all manuscripts received during my term as editor. As you can see, we've included some numbers for the papers submitted as part of various special research forums, but these papers were not included in any other calculations. Also, I must admit that, although the average number of days for a review looks pretty good, we must all remember that it's the variance that gets you in the end. Finally, I would like to take this final opportunity to thank the numerous reviewers, both Board members and ad hoc reviewers, who helped us in maintaining the *AMJ* tradition of short turnaround times.

Angelo DeNisi

Accept/Reject Statistics for July 15, 1993, to December 31, 1996

	Number	% of Total	Overall Average Review Time
New submissions			
Rejects with review	826	64.0%	70.8 days
Returned without review	121	9.0	
Revise and resubmit	318	25.0	
Withdrawn	25	2.0	
Total	1,290		
Revisions received			
Accepts	151	26.2%	48.3 days
Conditional accepts	128	22.2	
Reject with review	151	26.2	
Revision requested	116	20.1	
Under review	23	4.0	
Withdrawn	8	1.4	
Total	577		
Special research forums[a]			
Accepts	43	15.2%	
Reject with review	213	76.6	
Under review	26	9.2	
Total	282		

[a] Average review time not available.

PAST EDITORS

Paul M. Dauten, Jr., *University of Illinois*   1958–60

Dalton E. McFarland, *Michigan State University*   1961–63

Paul J. Gordon, *Indiana University*   1964–66

Stanley C. Vance, *University of Oregon*   1967–69

William G. Scott, *University of Washington*   1970–72

John B. Miner, *Georgia State University*   1973–75

Larry L. Cummings, *University of Wisconsin–Madison*   1976–78

John W. Slocum, Jr., *Southern Methodist University*   1979–81

Thomas A. Mahoney, *Vanderbilt University*   1982–84

Janice M. Beyer, *New York University*   1985–87

Richard T. Mowday, *University of Oregon*   1988–90

Michael A. Hitt, *Texas A&M University*   1991–93

Angelo S. DeNisi, *Rutgers University*   1994–96

THE INSTITUTIONALIZATION AND EVOLUTIONARY DYNAMICS OF INTERORGANIZATIONAL ALLIANCES AND NETWORKS

RICHARD N. OSBORN
Wayne State University
JOHN HAGEDOORN
University of Limburg

This article pictures a fascinating and sometimes confusing world in which different schools of thought, several methodological approaches, and distinct foci in terms of industrial background, modes of cooperation, and international patterns lay out the complexity against which one has to understand interorganizational networks and alliances. Given the multifaceted character of this topic, we encourage researchers to incorporate major elements of a multidimensional orientation in their future research.

If our modern world is one dominated by organizations with specialized contributions, scholars are beginning to recognize that it is by necessity also one dominated by the connections among these specialized entities. Once alliances and networks were viewed from a singular perspective based on a researcher's host discipline. Now scholars are reaching beyond these boundaries to develop a more multifaceted view. They are beginning to recognize that alliances and networks are evolutionary, multifaceted institutions for cooperation.

In the introduction to this journal's Special Research Forum on Alliances and Networks, we discuss the research trajectories that have led and are still leading the field of organizational alliance and network research. As the field has moved from a series of disciplinary bases toward an integrated theory, it has currently entered a period of chaos. In part this chaos reflects the explosion of interest in alliances. There were, for instance, over 60 submissions in response to the call for papers published in the *Academy of Management Journal*. The articles and notes in this special research forum reflect this chaos as the authors use a mix of theoretical perspectives and methodologies to understand the formation, evolution, operation, and outcomes of organizational alliances and networks.

Once most of the publications concerning alliances described the actions of one or a few firms and how they should or should not be using interfirm cooperation. As this issue shows, researchers can now easily find in-depth qualitative analyses, large-scale survey research studies, and analyses of secondary data. Collectively, the contributions in this issue also cut across numerous units of analysis, including individuals, firms, industries, nations, and, of course, alliances and networks.

A chaotic research field, replete with multiple theories, research designs, and units of analysis, is ripe for an era of integrative theoretical development. The integration might begin by recasting the roots of the field in the light of more recent developments. Smith, Carroll, and Ashford (1995) reminded us that alliances are hardly new, as 20 Greek city states formed an alliance to defeat Persia around 448 B.C. We will not go back that far—we simply note that scholars in economics and sociology struggled with the complexity and multifaceted character of alliances and networks almost 40 years ago (Hymer, 1960; Warren, 1967). By tracing developments in economics, strategy, and interorganizational field studies, we hope to help scholars build more easily upon prior work to develop an integrated theory and move the field out of chaos. Our review stresses the movement from narrow, rigid descriptions toward a recognition of complexity. It suggests some of the dualities inherent in studying cooperations. And, we hope, our discussion will remind scholars that studying alliances and networks can, as it has in the past, be based upon identifying and solving major social and economic issues.

ECONOMICS-BASED VIEWS OF ALLIANCES

Although much of the literature on alliances has stressed economic causes and consequences, mainstream economics has paid little attention to new forms of cooperative competition; brief treatments by Tirole (1988) and Milgrom and Roberts (1992) are representative. There are, however, some notable exceptions contributed by individuals studying R&D cooperations, international business, and transaction costs.

R&D Collaborations

Researchers adopting modern game theoretic approaches and the so-called new theory of industrial organization have sometimes incorporated cooperation in their competitive analyses and focused specifically on R&D collaboration. Several analysts have gone beyond the traditional neoclassical economic assumptions to chart both the negative and positive societal consequences of R&D cooperation. For example, Ordover and Willig (1985), Katz (1986), d'Aspremont and Jacquemin (1988), and Tirole (1988) suggested that cooperative R&D can have net beneficial effects on the larger economy and its innovative potential. In this literature, a favored argument for R&D cooperation also rests on the presumption of savings that will enable some firms to pass a threshold of fixed costs.

Unfortunately, comparatively little empirical research conducted in the 1990s seems to build upon this theoretical foundation of the 1980s concern-

ing the broader economic and societal consequences of collaboration; the contributions to the *Review of Industrial Organization*'s 1996 special issue on market failure in high-technology industries are demonstrative. Thus, even the implications of R&D collaboration remain relatively unexplored. For instance, researchers are still emphasizing descriptive accounts of their analyses of government-sponsored research cooperations such as JESSIE and ESPRIT in Europe, SEMATECH in the United States, and large-scale Japanese efforts in semiconductors (TRON). As might be expected, the accounts suggest mixed results, which may be due in part to an incomplete theoretical perspective. For instance, few attempts have been made to analyze the network effects associated with large-scale cooperative R&D.

The International Business Perspective and Alliances

In contrast to recent work on R&D collaboration, recent international business scholarship has built upon Hymer's (1960) path-breaking analysis of international monopolistic advantage and Vernon's (1966) discussion of international product life cycles. Viewing alliances as a temporary mechanism for the expansion of multinational enterprises, numerous writers have shown the potential importance of cooperations for multinationals (see Buckley and Casson [1988] and Dunning [1993] for reviews). Cooperations are important for coping with national political restrictions (Mowery, 1988), expanding a multinational's presence (Chang, 1995), and capitalizing on a combination of firm-specific, industry-specific, and alliance-specific advantages (Dunning, 1993). In this issue, the work by Swan and Ettlie extends this tradition by studying partially owned entities in addition to the more conventionally studied joint ventures and wholly owned subsidiaries and showing the importance of the former as mechanisms for multinational expansion (Hennart, 1991).

Much of the work in international business has incorporated arguments from transaction cost economics, which focuses on the individual firm and its use of alliances and networks to reduce the net costs of conducting business (Buckley & Casson, 1989; Dunning, 1993). Recently, there has been growing interest in the operation of international alliances (Geringer & Woodcock, 1993) and in both their longevity and their performance (see Park and Ungson and Saxton, both in this issue). Further, a few international scholars (e.g., Toyne, 1989) have recognized that international business may be as much influenced by the connections among actors as by the actors themselves. And although national culture continues to play an important role in international business analyses, scholars are beginning to suggest when, where, and why cultural differences might be important in alliance formation and longevity (see Park and Ungson and Barkema, Shenkar, Vermeulen, and Bell, both in this issue).

Many accounts of global competition have intertwined the issues of alliance formation (mainly the establishment of joint ventures), international trade, and foreign direct investment; Denekamp and Osborn (1997) provide a review. As noted, theoretical developments in the 1980s linked these issues

to the expansion of multinationals (Buckley & Casson, 1989), but the broader links among these issues has been generally neglected. Thus, even as a large part of the international business literature describes the increasing use of alliances, greater use of foreign direct investment, and rising international trade, obvious by their absence are analyses linking these apparently related aspects of internationalization in an era of global competition (see Denekamp and Osborn [1997] for an exception). Many international business scholars still seem predominantly interested in the expansion and operation of multinationals rather than in the emergence and implications of new institutionalized forms of cooperation for competition that transcend national borders.

Transaction Costs and Alliances

Transaction cost economics has had a profound effect on analyses of interfirm collaboration (e.g., Williamson, 1985, 1991). Many analyses of both domestic and international alliance formation utilize key concepts drawn from this body of literature. In this special research forum, this influence is clearly and directly seen in the contributions by Park and Ungson and by Nooteboom, Berger, and Noorderhaven and indirectly seen in the contributions of Dickson, of Weaver, and of Singh.

Since this perspective is so well known, it seems redundant to detail it here. We, as well as many others, also realize that with all of the multiple interpretations of transaction cost economics, it is quickly becoming more of a guiding metaphor than a tested set of propositions. Several substantiative developments have added to the robustness of the transactions view even as they have moved away from the initial statements by such scholars as Williamson. We describe three such developments.

One development is the expansion in the variety of forms alliances take and in the functions they serve. Once analyses merely sought to examine the gross choices among markets, hierarchies, and hybrid forms (mainly joint ventures and franchising agreements). Early studies, and even many recent ones, placed alliance administrative forms on a continuum from quasi-markets to quasi-hierarchies (e.g., Gulati, 1995). Now scholars are recognizing that distinct administrative forms of alliances should be considered separate and unique entities with identifiable capabilities and limitations (Hagedoorn, 1993; Singh, this issue). The differentiation among administrative forms has been accompanied by a broader view of alliance functions. Some still see alliances as just instruments to reduce transaction costs, but others suggest they may perform a wide variety of functions (cf. Kogut, 1988; Mowery, 1988).

A second development is an elaboration of some key alliance characteristics and the embeddedness of these characteristics. Once it was common to separate the description of an alliance from an account of its setting. However, many recent studies suggest that the direction of information flows through alliances, industry characteristics, and national origins are embedded in the administrative form and function of these entities (Osborn & Baughn, 1993).

This embeddedness of the administrative form in its environment has also led to a third development: a profound change has occurred in the research designs of alliance studies, even though there has been no explicit theoretical recognition of embeddedness. Some traditional examinations of transaction costs were based on the assumption that the level of some proxy variable reflected an aspect of the transaction cost perspective. Typical examples include proxies for uncertainty, asset specificity, or "small numbers bargaining" (Denekamp, 1995). For instance, variations in industry R&D have been considered surrogates for uncertainty. Industries with higher R&D rates were thus expected to have a higher proportion of alliances with more integrated forms (e.g., joint ventures) than more quasi-market forms (e.g., agreements). This idea and other cross-national and cross-industry expectations have not been generally supported, as there appears to be nonlinear, complex variation across industry sectors and nations (see Hagedoorn and Narula [1996] for a review). The notion that a single surrogate can represent a singular unmeasured transaction cost construct seems to be losing favor.

Even in studies based on transaction cost economics, unique industry characteristics are being recognized, and considerations of nationality are being moved from exogenous to endogenous status. For instance, Park and Ungson (this issue) show differing dissolution rates for U.S. domestic alliances and U.S.-Japanese alliances. Barkema and colleagues (this issue) document differences in the learning gained from participation in various forms of national and international alliances. Both industry differences and subindustry differences are evidenced in this issue in the contributions by Singh, by Swan and Ettlie, and by Nooteboom and colleagues.

Given a recognition of the multiple functions of alliances and of the embeddedness of alliance formation in its setting, and given studies showing important sectorial and national differences in outcomes, it seems reasonable to expect some fundamental changes in future transaction cost–based studies. Four needed changes seem obvious to us. First, we would expect to see more studies isolating precisely which sectorial and national factors are salient for specific types of alliances and networks. Second, we would expect and hope to see more multilevel studies involving national, industry, firm, and alliance levels of analysis (Dunning, 1995).

Third, we would expect to see more studies incorporating both transaction and non–transaction cost arguments to sort out the boundaries of the various theoretical perspectives. For instance, rather than assume transaction costs are always important, future work should recognize that they may be more relevant in some types of alliances than others. Researchers need to know when, where, and what types of transaction-based costs are salient for different types of embedded configurations of alliances and networks. Fourth, the notion that the presence of alliances represents an optimal transaction cost solution needs to be tested with multiple measures of alliance success. For instance, in this issue Dickson and Weaver suggest that important individual and social factors, not transaction costs, influence alliance formation,

and Singh questions the link between alliance use and firm survival; Saxton suggests differential relations between initial performance and subsequent estimates.

THE CORPORATE STRATEGY PERSPECTIVE

In contrast to the almost-40-year history of economics-based study of alliances, the history of strategy-based study began only recently. A host of strategy writers discovered the extensive use of alliances by large corporations in the 1980s. Much of the rich and colorful language currently used in alliance studies can be traced to the many case studies and cautionary notes by these writers (e.g., Hamel, Doz, & Prahalad, 1989; Perlmutter & Heenan, 1986; Reich & Mankin, 1986). Although many of these contributions lack a cohesive theoretical perspective, most share the presumption that senior managers rationally select an alliance option and craft each alliance to further the immediate interests of their firms. Specific alliances for specific firms were generally characterized by their strengths and weaknesses in helping a single parent counter threats and capitalize on opportunities to implement a chosen strategy.

Mixed Expectations concerning Alliances

Even as some articles implied that alliances represented a "best practice," executives were constantly provided conflicting advice on the use of alliances. Executives were warned about the difficulties of managing without control (Ohmae, 1989) and the dim prospects for the survival of alliances (Harrigan, 1985). Some writers declared that only very astute senior managers could successfully win in a race to learn to conduct alliances (Hamel et al., 1989) or prescribed how managers could use alliances to implement global strategy (Ohmae, 1989), but others were suggesting that U.S. executives were selling their corporate futures in dangerous alliance entanglements abroad (Reich & Mankin, 1986). Some even cautioned executives that the use of alliances was competitively dysfunctional and a signal of competitive weakness (Porter, Enright, & Tendi, 1990). As some articles introduced new reasons why a single firm should establish an alliance, others showed new problems in managing alliances and networks. Focusing on a single sponsor in an alliance, these authors paid comparatively little attention to the operation, evolution, and success of alliances as organizational entities or to their contributions to a range of stakeholders.

One of the key early problems for strategy writers analyzing alliances was the apparent discontinuity between the presumptions of command and control by senior executives underlying many strategic analyses, and the necessity to deal with issues of cooperation and negotiation in establishing and managing alliances and networks (cf. Geringer & Hebert, 1989). To resolve this apparent conflict, alliances were described as difficult-to-manage children of their corporate parents. A prospective parent was to chose a mate with caution, preferably a firm it already knew. A potential parent was also

advised to select a mate that was strategically compatible so that executives would not be working at cross purposes (Harrigan, 1985). Yet the mate should also be sufficiently differentiated to provide a missing element for a parent, or a new capability. Evaluations of the children were to be based on their contributions to a parent's strategy. Even into the 1990s, senior executives were advised to astutely manage their relationships with the other parents of the children (Kanter, 1994).

Revisions in the Early Estimates

Subsequent analyses, mainly those published in the 1990s, have suggested that the parent-child analogy, with its emphasis on senior management, was too limiting. The analogy did not fit the vast number of alliances formed in the 1980s and early 1990s (cf. Hagedoorn, 1993, 1996). There were just too many alliances being formed for all to be directly established by negotiations among senior executives or to be under their direct command and control. Given the vast number of new alliances, it seemed reasonable to treat the bulk of them as issues of business strategy rather than issues of overall corporate strategy.

We have no doubt that alliances are difficult to manage. Yet we have not identified a single study comparing the difficulty of managing an alliance to that of managing a comparably complex administrative unit. Some limited studies of joint venture general managers have suggested that theirs is not an easy task, but then, managing is hardly ever simple (Geringer & Hebert, 1989). Clearly, there is a need for more studies concerned with how alliances are actually established, who manages various aspects of their operation, and how managing lateral and quasi-lateral relationships across legal entities differs from managing more hierarchically structured entities.

Early estimates suggested that alliances were but a temporary port of convenience for partnering firms, subject to a quick death, but it is now recognized that new alliances may be no more prone to die than other new organizations (Park & Ungson, this issue). Interestingly, the death of a cooperative entity has often been seen as different from the death of a hierarchical one. To many population ecologists, the termination of corporate activity is a death, as firms are presumed to seek an infinite life. But some alliance analysts have suggested that termination of a cooperation might signal success in that a short-term corporate objective has been achieved (Gomes-Casseres, 1987). In the 1990s, researchers have begun to recognize that cooperations too may be assumed to have an infinite life. Collecting data on alliance deaths in sufficiently large samples is extremely difficult, however, and needs more attention (cf. Singh, this issue).

The once central notion of strategic compatibility seems to be fading in popularity. One difficulty with this concept is the sheer number of alliances among organizations with apparently quite discrepant characteristics. Either many firms are strategically compatible, or strategic compatibility is not particularly important in predicting alliance formation, operation, and success. In this issue, Saxton unpacks this notion using a different literature to

develop perceptual measures of strategic and organizational fit. He found that although strategic similarities were related to initial satisfaction with an alliance, neither initial satisfaction nor similarity was linked to alliance performance.

A second problem with the compatibility concept is that its measurement appears more illusive than its definition. Does the degree of compatibility of two organizations rest more in the eyes of senior managers or researchers than in definitively measurable organizational attributes? Park and Ungson's analysis of joint ventures (this issue) does not show that organizational measures of compatibility are important in dissolution rates. However, specific technology transfers and the extent to which sponsors are direct competitors does seem to matter. We would expect to see more comprehensive studies combining resource-based views and industry characteristics to begin to isolate when, where, and to what degree specific aspects of compatibility might be salient in alliance formation and performance.

Researchers are just beginning to see that the effectiveness of alliances is as multifaceted as organizational effectiveness (Arino, 1995; Saxton, this issue). For instance, there is a growing recognition that sponsors may have incompatible expectations for a given alliance; this might occur in many buyer-supplier alliances. The performance of an alliance as an organizational entity may be quite different from its contributions to a given sponsor, just as the performance of an organization is separable from its contributions to any particular stakeholder. Obviously, with initial measurement of performance at the current forefront of alliance and network research, multidimensional measurement is clearly a task for future research.

Revisions to Initial Theoretical Assumptions

Just as the economics-based studies of the 1980s emphasized the determinism of minimizing costs, many strategy studies relied on overly rational models of executive determinism. We would hope to see more balanced treatments emphasizing the potential for combinations of choice and determinism (Hrebiniak & Joyce, 1985). More strategy writers are also recognizing the importance of national and industry considerations (Shan & Hamilton, 1991), but analyses of how these factors influence the operation and performance of cooperations are still needed.

The laundry lists of reasons why a firm might or should establish an alliance are being displaced by more careful considerations of the types of alliances being formed (Singh, this issue). Future work might empirically show preferred combinations of the interests of multiple firms and area of industry activity for specific types of alliances and networks. For instance, researchers know that alliances for cost reduction, market penetration, learning, and technology development (Kogut, 1988) are more or less prevalent in specific industries (Hagedoorn, 1993). What is needed is more information on managing and assessing these entities.

The strategic interests of the sponsors of an alliance and its contribution to their strategic interests still play a prominent role in many recent empirical

works (e.g., Burgers, Hill, & Kim, 1993). However, many strategy writers have also adopted core theoretical insights from other theoretical perspectives (see Gomes-Casseres [1996] for a review). Increasingly, researchers are probing more sophisticated issues involving the establishment and management of networks of alliances (Human & Provan, this issue; Powell, Koput, & Smith-Doerr, 1996). What is needed are more multiple-level studies showing the measurable costs and returns to various sets of stakeholders.

THE INTERORGANIZATIONAL FIELD PERSPECTIVE

Sociologists studying government agencies and nonprofit organizations for the most part have often focused on the alliance and network relationships among units in the same geographical area (Warren, 1967). Rather than stressing how a single unit could achieve competitive success, they have characterized collective patterns of survival, growth, and sustainability. This interorganizational field perspective is most centrally represented in the current issue by the article by Human and Provan, who explore the development, evolution, and performance of networks of small manufacturers.

Within the organizations literature, the interorganizational field in which a firm was embedded was viewed as a characteristic of that firm's environment (e.g., Emery & Trist, 1965). This perspective was followed in a number of studies emphasizing environmental influences on organizations and their survival (Osborn & Hunt, 1974) and helped lead to the emergence of resource dependency views (Pfeffer & Salancik, 1978). The collective view also helped spawn analyses based on the precepts of ecological analysis (Hannan & Freeman, 1989) and a number of studies whose authors sought to understand the collective formation, performance, and survival of interconnected organizations. Although this early work is often not referenced in current studies, it provided a foundation for many current studies emphasizing technology and organizational learning, social and individual dynamics, and institutionalization.

Technology and Learning Views of Alliances

One development in the alliance and network literature consistent with a field perspective was the emphasis on participants' mutual adjustments to changing technological conditions (Contractor & Lorange, 1988; Hegert & Morris, 1987). Studies of alliances and networks existing under differing technological conditions have often also borrowed from older works in technology development and economics (Auster, 1992; Hagedoorn, 1993; Barkema et al., this issue). Although technology is considered important, there is some ambiguity as to whether the key challenge it poses might be in the form of technological change (Auster, 1992), technological intensity (Osborn & Baughn, 1990), "commercial inseparability" (Teece, 1989), or combinations of these factors. Yet, despite these differences, numerous studies suggest that the use of alliances has been more common in areas in which firms face daunting technological challenges (cf. Hagedoorn, 1993).

One important stream of research related to the technology perspective comes under the heading of organizational learning. The organizational learning framework focuses on collaboration as a response by organizations to environmental changes demanding improvement in their know-how, their technological capabilities, or both. Although organizational learning theorists studying alliances and networks do not exclude transaction costs or strategic considerations, the learning perspective does imply that transaction cost savings and immediate returns are not as critical as gains in technical capability, tacit knowledge, or understanding of rapidly changing markets; Kogut (1988) and Teece (1989) offer related arguments. In this literature, alliances are an important part of a learning process for firms, a process in which they discover new opportunities in a flexible setting of a multitude of changing partnerships (Ciborra, 1991; Hagedoorn, 1995).

Just touting alliances and networks as important corporate learning devices may raise more questions than answers. If organizational learning within a corporate hierarchy is problematic, surely such learning is much more complex in the context of a cooperative effort. For instance, is the change process similar in cooperative and hierarchical settings? Perhaps learning via alliances and networks is faster since it may not call for individuals and units to unlearn traditional routines. Perhaps the net benefit from participation is not so much what a firm learns from a specific alliance or network as it is the increase in the firm's learning capacity. Research has shown an increase in alliances formed in settings where cooperative learning appears to be particularly important (Hagedoorn, 1993). Researchers still do not know if firms improve their absorptive and learning capacities when they attempt to internalize knowledge and technological capabilities developed through alliance and network participation.

Are some aspects of organizational learning via alliances and networks more problematic than others? Probably so. Some speculations suggest that the ability to discover knowledge and then implement it may vary under different administrative forms for alliances (Osborn & Baughn, 1993). A variety of nonequity forms for organizing alliances are expected to provide a more effective environment for discovery of new knowledge than equity forms provide (Hagedoorn & Narula, 1996). More flexible, evolution-oriented nonequity forms may promote negotiation and day-to-day cooperation more than equity forms. Nonequity alliances may also better promote reciprocal information exchange and the development of a common language than do joint ventures and partial equity alliances. Equity forms are more likely to stress issues of control. Specifically, there will be more emphasis on setting targets, measuring progress against these targets, and taking corrective action—as if it were clear how the discovery process actually evolves.

However, it is also important to note that research-intensive cooperations often involve both the discovery and absorption of tacit knowledge that is not easily transferable or codifiable. The more organically structured nonequity alliance forms may not promote absorption back to sponsors as well as more hierarchical administrative forms do. Thus, where learning needs focus on

new markets or joint production and the actions of the alliance entity must be integrated with the actions of its sponsors, equity-based administration may be more appropriate than a nonequity structure. Here, transferring the knowledge a sponsor should act on may be more critical than developing common understanding. In sum, scholars need to unpack the issue of organizational learning to explicitly deal with what is to be learned, the setting in which it occurs, and the types of change needed for successful operations.

One thorny issue in studying organizational learning in potentially knowledge-rich alliances is the issue of information valuation, initially identified by individuals studying transaction cost issues (cf. Osborn & Baughn, 1990). Early on in an alliance, its sponsors cannot know the value of the others' information or the future value of the knowledge gained from collaboration. Potential sponsors cannot show the precise value of their knowledge without invalidating the worth of the information itself. Recent work suggests that for such knowledge-rich alliances, sponsors have favored nonequity forms because of their flexiblity and potential learning advantages, even though this administrative form offers fewer protections (Hagedoorn & Narula, 1996). However, systematic studies of whether this administrative form persists as commercialization proceeds, the degree to which more successful knowledge-rich alliances use such an administrative form, or the degree to which sponsors receive sustained net benefits from this form are still needed. In this issue, Barkema and colleagues begin to unpack the issue of organizational learning and show that it is a complex, contingent, and emergent process.

Social and Individual Characteristics

A second interorganizational field approach is to emphasize social and individual concerns within an overall network perspective (March & Olsen, 1976). As noted above, the social context of alliances and networks has been studied extensively in the international business literature in terms of various concepts and dimensions of culture (e.g., Park & Ungson, this issue). A host of empirical analyses have also shown differences due to the national origins of alliance sponsors, the degrees of economic development of nations, and the extent to which national comparative advantages are important (cf. Culpan, 1993); these studies support the value of conducting qualitative work on cultural differences.

Almost lost in the empirical study of alliances is the importance of the experience and predispositions of the individuals using them (Larson, 1992). Unlike virtually all previous empirical researchers, who have started with a population or sample of alliances, Dickson and Weaver (this issue) instead ask when and how alliances are used and study a number of social and individual factors related to alliance use, including the perceptions of key managers.

The potentially important role of individuals in operating alliances remains virtually unexplored. There are a few studies of joint venture general managers (e.g., Schaan & Beamish, 1988), and much of the basic understand-

ing of networks comes from studies of individual connections (Wasserman & Galaskiewicz, 1994). However, it is difficult to conceptualize individuals as members of alliances in the same way they are viewed as organization members. By their very character, many alliances do not contain individuals full time. Emergent patterns of relationships appear more salient in alliances and networks than the more traditional vertical and lateral placement within a hierarchy. A simple transfer of the accumulated knowledge gained in studying individuals and groups in organizational settings may be highly questionable if one presumes that both setting and individual characteristics interact (Dickson & Weaver, this issue). It may be necessary to revisit an older tradition in organizational behavior that stresses developing and managing nonhierarchical relationships (Sayles, 1964).

Institutionalization

Only recently has the third approach of the interorganizational field perspective been extended to alliances and networks. Analyses of interorganizational fields in sociology led to the study of institutional processes and institutionalization as researchers sought to explain and predict the vast areas of commonalty across various organized systems (Di Maggio & Powell, 1983).

We have already noted studies suggesting the embeddedess of alliances in their environments (e.g., Gerlach, 1992). The institutional perspective takes this idea one step further. Alliances and networks can be seen as experiments in institution building. An institutional view would suggest how and why common alliance practices emerge, are copied over time, and eventually become generally accepted practice (Baum & Oliver, 1991; Haveman, 1993; Oliver, 1992).

Specifically, an institutional perspective suggests that alliances and networks may be more than just a framework for the adaptation and cooperation of sponsors. They may also be socially constructed action takers (Holm, 1995). They may solve economic, technical, and strategic problems for their sponsors as they also develop, produce, and market goods, services, and knowledge. If alliances are socially constructed action takers, choices concerning the technical area of alliance activity, the administrative form of an alliance, and its patterns of information, product, and knowledge flows may be embedded in one another in a pattern consistent with the alliance's need to survive (Freeman & Hannan, 1989). Thus, there may be specific forms of embeddedness that represent solutions to both the needs of sponsors (for whom alliances are frameworks for action) and alliances as action takers themselves (cf. Human & Provan, this issue).

Although other perspectives have emphasized the importance of the logic of administrative controls and coercion or the dictates of the market and contract, an institutional view introduces a logic of association wherein the focus of attention is the alliance itself (Holm, 1995). Just as there are rules of successful conduct within contracts and hierarchies, there may be rules of conduct for a successful association. The more successful rules of conduct consistent with the logic of association may be based on reciprocity

and balanced exchange rather than on bounded self-interest in a market or effective control in a hierarchy. As Nooteboom and colleagues (this issue) suggest, analyses of the reciprocal actions of sponsor representatives as well as of the emergence of trust through shared common values and norms are just starting.

An institutional perspective offers the hope of potential integration of the economic and strategic perspectives, if it recognizes the multiplicity and complexity of alliances and networks. Rather than emphasizing a single aspect of alliances, scholars need to incorporate economic, technical, and strategic rationalities into their analyses of mimetic isomorphism (Haveman, 1993) and detail how these rationalities play against one another in different types of alliances. For instance, while recognizing that administrative entities subject to the same environmental conditions acquire a similar form (Freeman & Hannan, 1989), researchers need also to recognize the variety of choices still remaining. These choices include those concerning the selection of sponsors, the operation of an alliance, and the day-to-day administration of cooperation.

At this point, the institutional perspective appears stronger at the integrative level than at the level of providing specific answers to complex issues. A whole series of issues within the institutional framework still awaits investigation. For instance, this review has documented numerous studies of both markets and contracts and administrative controls and hierarchies. Even the conceptual foundations of a logic of association await development. How do the logics of contract, hierarchy, and association differ in practice? Is it necessary for sponsors to adopt a common philosophy in managing an alliance or network—that is, a common mix of market, administrative, and association logics? If institutional processes characterize alliances, what is the basis for imitation in international alliances? Could industry practices be a substitute for the traditional societal sources of imitation (Oliver, 1992)? And of course, if everyone is imitating everyone else, how can doing so provide an advantage to either an alliance or a sponsor?

From a more integrative perspective, a number of very sticky issues arise. How do researchers include the goal-dominated views suggested in economic, technological, and strategic perspectives into an institutional framework? How can the dualities suggested by an institutional perspective be studied while economic, technological, and strategic concerns are simultaneously incorporated? For instance, if alliances and networks are both collaborations (frameworks for action) between self-interested corporations and action takers, what types of balance within this duality will yield specific types of performance? Are there trade-offs between transaction cost economies and technological development? Must the sponsors sacrifice some short-term strategic benefits to develop a more viable alliance institution?

CONCLUSIONS

This review has emphasized changes in the collective vision of alliances and networks, predominantly, those occurring over the last ten years. Re-

searchers have moved from singular, clear-cut visions of simple corporate derivatives to recognize the complexity of alliances and networks. They have started to recognize the dualities inherent in analyzing these emergent institutions. Despite this progress, we would be remiss not to note a loss. The theoretical roots of the current analyses of alliances and networks were based in work on identifying and solving major social and economic issues. There is little such work now.

Many once-strongly-held assumptions from host disciplines appear too limiting when applied to the study of alliances and networks. The assumption of executive determinism based on the immediate interests of a firm so evident in the early work of strategists appears inconsistent with the vast number of new alliances and the complexity of emerging corporate networks. Some alliances may be designed to reduce transaction costs, but this is not their only function. Alliances may be more prevalent in high-tech areas, but they also appear to be a part of a larger picture of internationalization in mature areas. And although alliances may be increasingly popular, their direct contribution to short-term firm performance may be quite problematic.

The once-strongly-held assumptions adopted from host disciplines yielded clear-cut, defensible, and testable hypotheses. Initially, they seemed to provide dramatic progress; over time, they have yielded a series of conflicting, limited, and biased views. Focusing exclusively on transaction costs, a sponsor's strategic interests, the predilections of a CEO, or the technical conditions surrounding alliances may hide more than it reveals. We realize that, when dealing with the complexity of studying alliances and networks, researchers must set a ground to see a figure and adopt analogies to begin to understand recognizable features. We encourage researchers to abandon a singular, clear-cut description of alliances and networks based on the assumptions of a host discipline in favor of a more robust, sophisticated, multidimensional vision.

One more robust and realistic view of alliances and networks might be built on a foundation of dualities. Our review suggests but a few of these. Alliances are older than firms, but they are still new to many firms. They are temporary mechanisms and long-lasting relationships. They are cooperative and competitive weapons. Each is unique, but they often share similar properties. They have intended purposes, yet their emergent benefits may be more important.

Each participant may have a clear-cut mission for an alliance or a network, but the intentions of the participants in any one alliance or network may differ very widely. Powerful cultural, economic, and technological forces may precipitate alliance creation, but each alliance is the result of an individual choice. Alliances and networks are strategically determined, and they emerge as natural by-products of corporate activity. They show the reach of a firm and the grasp of its limitations. They are frameworks for action and action takers. They represent understandings and values shared across organizational or cultural lines in domains in which no mechanism

for comparing values and understandings is evident. They represent simple deals and complex emergent patterns of behavior.

Future progress might arrive in a variety of ways. A very prominent and retiring scholar suggested that new theory is best conceived by a few scholars via thoughtful discussion over fine wine in front of a roaring fire. In that context, a key to intellectual progress is to capture the sustaining desire of the intellect for inquiry. A second approach is to seek a collective focus among a group of interconnected scholars from different disciplines paying attention to major social issues. We can envision scholars working on networks and alliances to converge on a number of social issues. For instance, can alliances and networks be configured to ameliorate certain aspects of competition or bureaucracy? What, if any, are the sustaining contributions of alliances and networks to the larger economic and social systems in which they rest? As alliances and networks proliferate, to what extent will globalization be guided by competition across cooperations? What roles can and do individual managers play in different types of industries and nations in establishing frameworks for action? How do managers take and sustain effective action within the context of a competitive cooperation?

While this Special Research Forum on Alliances and Networks shows where scholarship is and has been, we also hope it is a point of departure. We hope that our identification of a still rather chaotic field marks a preliminary step in the creation of a new, more integrated theory of alliances and networks.

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THE EFFECT OF NATIONAL CULTURE, ORGANIZATIONAL COMPLEMENTARITY, AND ECONOMIC MOTIVATION ON JOINT VENTURE DISSOLUTION

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This study examined the effects of partner nationality, organizational dissimilarity, and economic motivation on the dissolution of joint ventures. Event-history analysis was used to test the hypotheses in a sample of 186 ventures. Cultural distance in general did not have an effect on dissolution, but U.S.-Japanese joint ventures lasted longer than U.S.-U.S. joint ventures. Prior relationships between partners appeared to negate some complexities arising from cultural differences. Opportunistic threat and rivalry appeared to be a stronger indication of the dissolution of joint ventures than organizational variables.

As markets continue to become global and firms become more international, joint ventures, particularly cross-border joint ventures, increasingly provide firms with opportunities to rapidly expand geographical market participation, create economies of scale and critical mass, reduce risks, learn new skills and technologies, and facilitate effective resource sharing (Bleeke & Ernst, 1993; Harrigan, 1988; Slocum & Lei, 1992; Yip, 1992). With joint ventures becoming a powerful force shaping firms' global strategies, it is not surprising that partnerships between horizontally related firms (i.e., direct competitors) have significantly increased since the 1960s (Morris & Hergert, 1987). Despite all their purported benefits, however, joint ventures are risky and highly unstable (Blodgett, 1992; Parkhe, 1993a). Various performance measures have been applied to joint ventures, with results showing a consistently high rate of failure. The dissolution rate is reported to be about 50 percent (Harrigan, 1988; Kogut, 1988). Porter's (1987) study of 33 randomly chosen, largely diversified U.S. companies disclosed a dissolution rate of 50.3 percent during the period 1950–86. This rate is as high as that for mergers and acquisitions in new industries (53.4%), and it is higher than

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the dissolution rates for internal venturing (44.0%) and corporate buyouts (21.4%) (Porter, 1987; Wright, Robbie, Thompson, & Starkey, 1994). Beyond the high dissolution rate of joint ventures, other adverse effects have been noted, such as involuntary loss of potential revenue (i.e., economic rents), uncompensated transfers of technology (Hamel, Doz, & Prahalad, 1989; Levine & Bryne, 1986), and operational difficulties and problems, disagreements, and anxieties over the loss of proprietary information (Gomes-Casseres, 1987).

What causes such instability? A fundamental premise is that joint ventures are formed primarily so that participating firms can gain core skills that would be very difficult for them to obtain on their own (Murray & Siehl, 1989). This idea suggests that the stability of any joint venture depends on the complementarity between the partners. Although other goals (for instance, political goals), may be operative, a joint venture will remain stable for as long as the partners continue to acquire core skills from the partnership that lead to economic benefits (Kogut, 1989). In this research we conceptualized complementarity between joint venture partners in terms of their similarity on certain organizational variables and the convergence of their economic motivations. In the case of cross-border joint ventures, the distance between their national cultures would be a critical component of complementarity. Previous studies have raised the issue of the potential impact of these variables but have focused on the singular or independent effects of the variables on dissolution, not on their interrelated or interactive effects (Parkhe, 1991). Hence, a more comprehensive examination of these variables within an integrated theoretical framework (an enlarged transaction cost setting) was the goal of this study.

Three specific research questions were formulated and tested: (1) Do cultural differences increase dissolutions in cross-border joint ventures? (2) How do U.S.-Japanese joint ventures compare with U.S.-U.S. partnerships in terms of dissolution? and (3) How is the dissolution of joint ventures tempered by certain economic and organizational variables? We built theoretical arguments for examining the three questions in the context of a broader transactional cost framework that tests for the destabilizing effects of these variables. Within this framework, we incorporated emerging arguments stating that joint ventures are not predestined to fail and that proper design and coordination can facilitate their stability (Bleeke & Ernst, 1993; Slocum & Lei, 1992). These arguments provide perspective on previous studies that have examined partner similarities and dissimilarities (Harrigan, 1988), internal structure (Killing, 1983), equity structure (Blodgett, 1992), country of origin (Beamish, 1988), and various economic characteristics (Kogut, 1989, 1991; Parkhe, 1993a) as potential sources of the dissolution of joint ventures. The current study places the discussion of cross-border joint ventures into a broader contingency framework. We used event-history analysis—specifically, the accelerated event-time model and maximum likelihood techniques—to test the hypotheses in a sample of 186 joint ventures.

PREVIOUS RESEARCH, THEORETICAL FRAMEWORK,
AND HYPOTHESES

A theme that cuts across previous empirical work is the difficulty of conceptualizing and measuring joint venture performance. Several measures of joint venture performance have been used in prior research, including both objective (termination, duration, financial gains, and so forth) and subjective (goal attainment, satisfaction, etc.) types. Although both types of performance measure are important, collecting two sets of data has been operationally difficult (Parkhe, 1991). Consequently, a lack of consensus regarding a measure for performance has complicated the interpretation and comparison of these studies (Geringer & Hebert, 1991; Parkhe, 1993b).

In view of the numerous operational definitions of joint venture stability and the contestability of various measures of performance (Anderson, 1990), we limited our study and subsequent interpretations to the dissolution of joint ventures that had no fixed duration. A joint venture is a contractual arrangement that creates a separate legal entity in which the parent firms hold ownership interests under conditions and provisions that are specified by a legal document (Murray & Siehl, 1989). A fundamental premise is that a joint venture is not expected to last indefinitely and, therefore, the instability of any joint venture can be measured in terms of its expected duration. Hence, instability can be signaled by unexpected termination, through a dissolution, a sell-off, or an acquisition. Similar measures have been widely used to represent the performance of joint ventures (Harrigan, 1988; Kogut, 1989; Porter, 1987).

Kogut (1989) argued that dissolution typically reflects a business failure or an irresolvable conflict among partners. Porter (1987) contended that dissolution is significant because companies generally do not divest or shut down a successful joint venture; dissolution happens only when the venture is not financially viable. Not surprisingly, he found dissolution to reflect poor financial performance in one, if not both, parties. Dissolution is also associated with less tangible adverse outcomes, such as loss of reputation. Particularly in the case of cross-border ventures, dissolution can create long-term political tensions (Lane & Beamish, 1990). The parties involved in a joint venture dissolution might not subsequently be considered desirable alliance partners for others. Moreover, the host country that sponsored the local firm might not be considered a suitable place for investment (Franko, 1971).

Studies more recent than those cited above also attest to the significance of dissolving a joint venture. Ring and Van de Ven argued that "in addition to economic considerations, there are powerful social-psychological motivations for preserving relationships that entail transaction-specific investments" (1994: 106). Investments in interfirm cooperation include not only economic and technological resources of participating firms, but also social commitments and entanglements of individual agents (Ring & Van de Ven, 1994). Therefore, those authors concluded that "it is not only in the economic but also in the psychological best interests of the organizational parties to

find ways to preserve their socially embedded relationship" (Ring & Van de Ven, 1994: 107). In their view, the dissolution of a cooperative partnership, such as a joint venture, represents organizational failure.

From a field study of several cross-border joint ventures, Lane and Beamish (1990) concluded that a successful joint venture indicates a stable business relationship that meets the needs of both partners over the long term. Geringer and Hebert (1991) examined the reliability of alternative measures of joint venture performance. In joint ventures that included at least one U.S. partner, dissolution was highly correlated with parent firms' reported dissatisfaction with the ventures and their perceptions of how the ventures performed relative to their initial objectives. Geringer and Hebert concluded the following: "International joint ventures perceived by their parents as performing more successfully were more likely to remain in operation than those international joint ventures that were evaluated as being less successful. Successful international joint ventures also tended to remain in operation for a longer period of time" (1991: 258).

The Impact of Cultural Distance on Joint Ventures

Although the fundamental tenet of a cross-border joint venture is that the economic and organizational transactions that will occur within it are variable, the nationalities of the partners are a given. Thus, the assumption is that the participants in cross-border joint ventures represent the values and institutions of territorially organized markets defined by nationality (Ronen & Shenkar, 1985; Shan & Hamilton, 1991). Although nationality alone cannot fully capture cultural values, national boundaries delineate the legal, political, and social environments within which organizations and workers operate (Ronen & Shenkar, 1985). Studies by Parkhe (1991) and by Child, Markoczy, and Cheung (1992) have shown that national culture affects managerial behavior and moderates the relationship between structural variables and the performance of joint ventures.

There have been numerous discourses on the effects of cross-cultural differences on management practice (e.g., Hofstede, 1980, 1994). Even so, relating partner nationality to joint venture failure (Child et al., 1992) and to forms of joint partnership (Barkema, Bell, & Pennings, 1996; Osborn & Baughn, 1990) is relatively recent. Because the relationship between partner nationality and dissolution was not necessarily the focal point in prior studies (e.g., Hofstede, 1994), and because the related effects of organizational and economic variables have not been systematically investigated, what is known about the dissolution of cross-border joint ventures is fragmented and not systematically integrated (Harrigan, 1988; Parkhe, 1991).

The case against cross-border joint ventures (and for national ventures) is generally based on the "simple" proposition that similar cultural values can reduce misunderstanding between partners and that culturally distant joint ventures experience greater difficulty in their interactions (Brown, Rugman, & Verbeke, 1989; Lane & Beamish, 1990). The more culturally distant two firms are, the greater the differences in their organizational and adminis-

trative practices, employee expectations, and interpretation of and response to strategic issues (Kogut & Singh, 1988; Schneider & De Meyer, 1991). Accordingly, communications between culturally distant partners can be difficult, compounding the coordination problems that exist in any partnership, leaving such joint ventures vulnerable to managerial conflicts and early dissolution (Camerer & Vepsalainen, 1988; Lane & Beamish, 1990). Moreover, environmental uncertainty enhances the transactional difficulties in cross-border joint ventures (Kogut & Singh, 1988). Poor communication and mutual distrust can make the transfer of management practices and technologies very costly (Clegg, 1990; Perlmutter & Hennan, 1986). The effects of national culture on behavior and management systems can be rather unobtrusive but can still destabilize joint ventures, prompting Lane and Beamish (1990) to conclude that cultural compatibility between partners is the most important factor in the endurance of a global alliance. Barkema, Bell, and Pennings (1996) also showed that joint ventures (or acquisitions) were more susceptible to cultural distance than wholly owned subsidiaries (or start-ups) because the former had to contend with both national and corporate cultures, or "double-layered acculturation." Collectively, these arguments suggest the following hypothesis:

> *Hypothesis 1a. Joint ventures are more likely to dissolve when the partners are from culturally distant countries.*

The Impact of Japanese Culture

In both practice and theory, the cultural distances between countries vary (Hofstede, 1980). In a study of the impact of national culture on modes of foreign entry and ownership structure, Barkema and colleagues (1996) implored future researchers to be attentive to the differences between cultural blocs. Although cultural differences bear on the management of joint ventures, the selection of a specific foreign joint venture partner has important implications on the scope and breadth of a firm's global strategy. As a way of testing the robustness of our first hypothesis, we explored various pairs of cultural blocs, but we remained attentive, at least theoretically, to the special case of Japanese-American joint ventures. With the emergence of Japan as an economic superpower, the role and strategies of Japanese firms, particularly their partnerships with U.S. firms, have become increasingly important (Osborn & Baughn, 1990). The combined gross national products (GNPs) of Japan and the United States constitute about 40 percent of the world's GNP. Partnerships between Japanese and U.S. firms would seem to present a benign picture of international cooperation. Yet U.S.-Japanese joint ventures have been criticized for various reasons. Reich and Mankin described U.S.-Japanese joint ventures in high-technology industries as "part of a continuing, implicit Japanese strategy to keep higher-paying, higher value jobs in Japan and to gain the project engineering and production process skills that underlie competitive success" (1986: 78). In doing so, Japanese firms increase the benefits they extract from a joint venture across the "collaborative membrane," leaving the European or American partner in a worse

strategic position than it was in formerly. Authors have suggested that Japanese partners are generally smarter than Western partners and that they do not always behave ethically (Hamel et al., 1989; Reich & Mankin, 1986).

Despite these criticisms, we argue that there are institutional and economic reasons that make joint ventures involving Japanese firms more enduring than other joint ventures. North (1990) proposed that institutions within a society serve to economize on the transaction costs of achieving mutual cooperation. Broadly defined, institutions are constraints that shape human interactions; such constraints can be either formal ones, like political and economic systems, or informal ones—such as the norms and values of society. Institutions arise because of the uncertainties involved in human interaction. By defining acceptable and unacceptable conduct, institutions reduce uncertainty and structure economic and noneconomic exchanges. In effect, institutions reduce the complexity of activities in an uncertain environment. Relatedly, Casson (1991) argued that performance generally depends on transaction costs, which in turn reflect level of trust. Without trust, transaction costs tend to be high because more monitoring and safeguards against opportunistic behavior are needed. But a strong culture based on trust can overcome problems that formal procedures based on monitoring cannot. Thus, clan-like behaviors become the most efficient governance structure in organizations characterized by ambiguous monitoring goals and performance standards (Ouchi, 1980). Hill (1995) used a similar argument to explain how a trust-based society, such as Japan, can lead to lower transaction costs and give Japanese enterprises a competitive advantage over their (Western) competitors. Shane (1994) also illustrated that multinational corporations choose market-like entry strategies over direct investment in such high-trust cultures because the threat of opportunistic hazards is low.

Consider a case in which two partners need to cooperate at an early stage of an enterprise but know that they may become competitors at some later stage. Both partners would be willing to invest time and effort in anticipation of benefits, even if the collaboration is temporary. However, both partners know that current intentions are insufficient, for once the early stage is completed, they could act opportunistically by withholding important information, providing false information, or simply cheating each other. In such cases, a contract containing enforcement characteristics would be written. However, most contracts are incomplete, so their enforcement generates high transaction costs (Williamson, 1985). Accordingly, informal constraints (institutions)—reputation, broadly accepted norms of conduct, and conventions that emerge from repetitive interactions—play a major role in actual agreements (North, 1990). Thus, an evaluation of any cross-border joint venture should consider the nationalities of each partner and specifically, how the values and institutions imbedded within these nationalities lead to potential cooperation (or competition) in the presence of potential competition between two partners.

Even though studies have shown national differences in levels of trust, most have compared America and Japan (Ouchi, 1980; Shane, 1994). In our

view, in addition to trust, at least three elements of Japanese culture econo-
mize on transactions. Although several such values have been alluded to in
the literature, the most common ones are group identification and collective
responsibility, loyalty, filial piety, harmony, and a sense of reciprocal obliga-
tion (Hill, 1995). These values make self-control and peer pressure overriding
concerns in matters that involve individual firm performance and rivalry. A
second element is that Japanese firms tend to have a longer time orientation
than their Western counterparts (Dore, 1987; Ouchi, 1980). As a result, they
may exercise much more patience in accomplishing the goals of a joint
venture. The third element is a concern for honor and worldwide reputation
(Pucik, Tichy, & Barnett, 1992). Japanese firms operating in a global economy
are loathe to develop the unsavory reputations that can easily result if oppor-
tunistic behavior occurs and persists over time. Upholding one's good reputa-
tion is considered to be essential when partners anticipate further interac-
tions with one another, or interactions with others in the future. Taken
altogether, these institutions are reasons why cross-border ventures with the
Japanese would be less likely to dissolve and have greater longevity than
other joint ventures.

The contrasting group of joint ventures are those among American firms
or among American firms and firms from contexts similar to the United
States. We suggest these are more likely to dissolve for several reasons.
American managers tend to rely on formal contracts and binding arbitration
to resolve conflicts (Sullivan & Peterson, 1982; Thorelli, 1986). The strength
of norms mandating these practices builds enforceable threats or commit-
ments and lessens uncertainty about opposite parties' cooperative behavior.
Moreover, these joint ventures tend to operate in an institutional environment
that favors short-term profitability and in which stockholder pressure for
quick results encourages interfirm rivalry (Thurow, 1992).

To the extent that one or both partners are strongly concerned with
reputation and goodwill and that norms of reciprocity and trust prevail,
informal institutions will facilitate cooperation, attenuate opportunism, and
resolve disputes between venture partners. We expect that joint ventures
will be stable and enduring under such conditions. Conversely, joint ventures
will be less stable if prevailing norms encourage opportunism or short-term
"gainsmanship," to the extent that such conduct is readily observable. The
foregoing arguments lead to the following hypothesis:

> *Hypothesis 1b. U.S.-Japanese joint ventures are less likely
> to dissolve than U.S.-U.S. joint ventures.*

The Effects of Firm Scope, Size, and Age

In addition to the distance between partners' national cultures, partners'
compatibility on specific organizational attributes also affects the dissolution
of joint ventures (Gray & Yan, 1992; Killing, 1983; Lane & Beamish, 1990).
Since a joint venture is typically a hybrid of two independent firms, dissimi-
larities in organizational structures and processes can create problems in
coordination that can lead to dissolution of the joint venture. In contrast,

similarity in partners' organizational structures and processes can facilitate mutual understanding and collaboration. This view is consistent with that of Bleeke and Ernst (1993), who found that cross-border joint ventures per se are not as problematic as joint ventures between companies with strong and weak cultures, or those between companies with asymmetric financial ownership. Brown, Rugman, and Verbeke (1988) argued that the compatibility of organizational processes may be more significant than the similarity of national cultures in explaining the dissolution and duration of a joint venture. As dissimilar partners may expend time and energy to establish standard managerial routines to facilitate communication, they may incur higher costs and mistrust than similar partners. Although a number of organizational structures and processes may bear on this relationship, we hypothesize that three in particular have direct implications for joint venture dissolution: (1) the breadth and scope of strategic activities, (2) size differences, and (3) organizational age.

Breadth and scope. Impelled by Chandler's (1962) historical study of U.S. corporations, scholars have examined the relationship between growth strategies and the internal structures and processes of an organization. In the body of conceptual and empirical research on diversification, it is postulated that variations in the structures, processes, management focuses, control systems, and internal value systems of firms are related to the product-market diversity and the breadth of activity firms pursue, which is broadly defined as strategic scope (Chandler, 1962; Galbraith & Kazanjian, 1986; Rumelt, 1974). Diversified firms with broad product and market scope require more complex information-sharing and decision-making processes than single-business firms. In comparison with single-business firms with centralized views and decision-making systems, diversified firms require greater decentralization, self-containment of divisions, less important roles for corporate staff, higher monitoring costs, and more rules. Strategic grouping within diversified firms directly shapes organizational culture by focusing resources, shaping patterns of interaction, and conveying what is most strategically important (Nadler & Tushman, 1988: 155). The foregoing arguments suggest:

> *Hypothesis 2. Joint ventures between partners of similar strategic scope are less likely to dissolve than those involving partners differing on strategic scope.*

Size. In addition to breadth and scope, size is another important internal factor that shapes behaviors and decisions (Lane & Beamish, 1990; Nadler & Tushman, 1988). The consequences of size differences have a long history in organization theory. Weber (1947) attempted to define the correlates of large bureaucratic organizations. Child (1972) contended that bureaucratic structures emerge with increases in organizational size. With increased size, it becomes difficult to employ a personal, entrepreneurial style of management. Largeness creates complexity, which increases rules. Accordingly, a centralized management system, using impersonal mechanisms of control, may become the norm.

Shan and Hamilton (1991) presented empirical evidence that the firm-specific assets of small and large firms differ and that small firms are more likely to cooperate than large firms. Joint ventures between differently sized firms often lead to differences in corporate perspectives, value systems, and methods of aligning internal resources. Organizational size also affects a partner's vulnerability to exploitation and the economic effectiveness of the transaction itself (Osborn & Baughn, 1990). For example, small firms are highly vulnerable when entering high-technology-based cooperative ventures because their sole technical cores are placed at risk.

At a more micro level, the impact of size on structure, job attitude, and behavior is well established (Porter & Lawler, 1965). For example, managers from larger companies are less inclined to adopt participative managerial attitudes, and those from smaller organizations are more flexible regarding their subordinates' capacity for leadership and participation in major decisions (Haire, Ghiselli, & Porter, 1966; Ronen & Shenkar, 1985). Doz (1988) indicated that joint ventures between large and small firms experience difficulties because of idiosyncratic incentives for partners, cultural variation, and asymmetric policies in information distribution. In cross-border joint ventures, large foreign parents tend to be systematic and have a long-term approach, but their local partners are often entrepreneurs with no established operational systems and policies who are looking for immediate financial returns (Lane & Beamish, 1990). Killing (1983) provided a case study in which organizational size was related to corporate culture and in which size differences between partners affected joint venture performance. Size also affects ownership structure and agency relationships in a firm (Aldrich, 1979). Companies should be of equivalent size so that there is equally as much at stake on each side. These arguments lead to the following:

> *Hypothesis 3. Joint ventures between partners of similar sizes are less likely to dissolve than those involving partners of different sizes.*

Age. Organizational history is also an important determinant of partner behavior. Nadler and Tushman argued that "an organization's history has a very strong influence on the values and beliefs that develop over time" (1988: 151). Specifically, historical forces that influence organizational culture also reflect the circumstances of the birth of an organization, the crises it has faced, how those crises have been resolved, and the organizational referents admired or used as ideas in its history. Management problems and principles are rooted in time, and the age of an organization reflects institutionalized managerial attitudes and beliefs (Baker & Cullen, 1994; Greiner, 1972).

A fundamental assumption in population ecology is that inertia is a prevailing property of organizational evolution and that consequently, organizations retain basic attributes of their early forms (Hannan & Freeman, 1984). Studies of organizational mortality suggest that hazard rates vary with age. The term "liabilities of newness" is used to describe the fact that hazard rates are high initially and decline strongly with age for diverse populations

of organizations (Hannan & Freeman, 1984). Young organizations are subject to such liabilities because routines are rarely perfected and stabilized, organizational politics are unstable, and links with key actors in the environment are irregular. It takes time to work out routines and develop trust and smooth working relationships. It also takes time for an organization to acquire institutional legitimacy among its members and to become valued in its own right. Newness liabilities can also be attributed to size because new organizations are typically small organizations. Older organizations also often become overly bureaucratized; rules are easier to establish than to get rid of, so the number of rules increases over time. Along with size, age captures growth strategies as well as implicit organizational demographic characteristics such as leadership styles, control systems, and entrepreneurial behavior (Greiner, 1972). Thus, joint venture partners with different organizational histories easily experience conflict in coordinating their activities. Thus,

> *Hypothesis 4. Joint ventures between partners of similar ages are less likely to dissolve than those between partners of different ages.*

The Effect of Economic Motivation

Researchers have depicted the joint venture as a governance structure with characteristics appropriate for certain strategic or transactional cost motivations (Hennart, 1991; Kogut, 1988; Park & Russo, 1996). As a form of governance "between markets and hierarchies," the joint venture mitigates the worst consequences of mistrust and opportunism. Through a reciprocal governance structure involving equity sharing, a joint venture can avoid the market inefficiency that results when idiosyncratic and specific assets are involved in a transaction (Kogut, 1988). Reciprocity provides mutual safeguards against transactional hazards that can occur in a market setting. A joint venture also provides firms with a suitable context in which they can exercise mutual forbearance (Buckley & Casson, 1988), which leads to coordination and efficiency in governing relationships.

Although firms form joint ventures with expectations of reducing rivalry among them, such competitive forces cannot be completely redressed, and they persist as potential sources of dissolution (Kogut, 1989). Beyond cultural distance and organizational dissimilarity, the compatibility of the partners' economic motivations affects venture dissolution. Since it is generally assumed that firms establish joint ventures to improve their competitive positions, a partnership will succeed to the extent that the partners gain access to each other's core skills, including know-how, assets, and human resource, market access, government and political, and knowledge capabilities (Alston & Gillespie, 1989; Beamish, 1988; Contractor & Lorange, 1988). The potential to use such skills within the learning objectives of the joint venture is what we refer to as *economic motivation.* Joint ventures will be less stable when the partners' contributions are asymmetric and inequitable over time (Porter & Fuller, 1985). These conditions create asymmetric dependency

between partners (Hamel, 1991) and encourage opportunistic behavior (Hladik, 1985; Park & Russo, 1996). The balance between economic benefits and opportunism depends on the relationship between the partners in a given joint venture, the relationship between the venture and the partners, and the nature of the partners' contributions. These ideas form the core of our next three hypotheses.

Competitive ventures. Joint ventures formed between direct competitors are hypothesized to experience a higher dissolution rate than those between indirect competitors for a number of reasons. Although joint ventures are formed to mitigate competition, they invariably affect the competitive positions of the participating firms. Kogut (1988) argued that the fear of competitive rivalry that leads to a joint venture's formation might also contribute to its eventual demise. This fear is particularly pronounced in joint ventures between firms competing in the same market, where present friends can easily become future foes (Harrigan, 1988; Morris & Hergert, 1987). Moreover, in a joint venture between competitors, goals are likely to be in direct conflict, and the venture can be detrimental to the attainment of such conflicting goals (Kogut, 1988; Park & Russo, 1996). Given similar strategic objectives and, in many cases, similar resource bases, a partner can identify, appreciate, and then assimilate another partner's know-how (Cohen & Levinthal, 1990). Thus,

> *Hypothesis 5. Joint ventures are more likely to dissolve when the partners are direct competitors.*

Operational overlap. The ability of participating firms to enjoy economic benefits also depends on the role of a joint venture for a partner. The competitive spirit and threat of opportunism within an alliance can be minimized when each partner can view the alliance and the other partner as a source of economic benefit. Lack of economic complementarity in an alliance raises costs because efficiency and effectiveness are lost (Hladik, 1985). Partners become less forbearing and pursue self-interest without complementary benefits. Therefore, a strategic alliance is justified only when the direct complementary benefits gained from the collaboration exceeds the costs of coordination and control and the risks of opportunism. The level of economic complementarity is determined by the extent to which activities are new to partners. When a joint venture is an expansion of the partners' operations, as in the case of movement into new international markets or new product areas, more complementary economic benefits accrue. When, however, a venture operates within the product-market scope of one or both of the partners, economic benefits tend to be minimal and less visible, creating internal conflicts for the partners. A joint venture perceived as peripheral to a partner's strategy will yield few opportunities for the transfer of new knowledge, so interaction between the partner and the venture's management will be inconsistent and insufficient, as will be resource commitments to the venture's management (Inkpen, 1995; Nueno & Oosterveld, 1988). The above arguments suggest the following:

Hypothesis 6. Joint ventures are more likely to dissolve when there is a high level of overlap in product-market scope between the joint ventures and the partners.

Technology ventures. When a joint venture depends on know-how or technology that cannot be easily codified and requires intimate human contact for exchange, venture partners can appropriate firm-specific competitive advantages (Hamel et al., 1989). Porter and Fuller (1985) argued that joint ventures involving technology transfer fail mostly because of opportunistic behavior that induces unexpected leaks of replicable firm-specific assets. Thus, a joint venture characterized by an exchange of technologically specific know-how is more vulnerable than one that involves more discrete contributions, such as financing or physical resources (Teece, 1986). Furthermore, the transfer of technology normally leads to asymmetric possession of information, and partners face difficulties in understanding what is transferred and how much to expect in return (Teece, 1980). In contrast, a joint venture that is not based on the exchange of technology can be more stable in that the scope of operation and boundary of appropriation can be clearly specified in contractual terms, making it easier to estimate the partners' contributions and monitor their behavior. Therefore,

Hypothesis 7. Joint ventures are more likely to dissolve when contributors involve technology transfer.

RESEARCH METHODS

Sample Design

Typically, advances in social science research stem from ideographic observation of microbehaviors that are statistically validated through cross-sectional sampling to allow modest generalization (Harrigan, 1988). The study of joint ventures, however, poses major difficulties in that it is not easy to fully capture the soft or behavioral variables that undergird joint venture activities because of their complexity and multidimensionality (Parkhe, 1993b). Moreover, in practice, it is difficult to draw a random sample from the entire spectrum of joint ventures that meet the requirements for external validity. Some trade-off between internal consistency within a sample and external validity is needed. In selecting our sample, we were concerned about the following aspects of joint ventures.

Although interfirm partnerships encompass both equity and nonequity structures, we limited our sample to equity alliances, or joint ventures. This approach is consistent with that of many previous studies (e.g., Kogut, 1988) because the governance structure of a joint venture is well defined and standardized. In contrast, nonequity alliances (e.g., technology, joint R&D, supply, and marketing agreements) have governance structures with highly varied definitions and scope. In effect, differences in their organizational management, control mechanisms, compensation systems, and goals can confound the comparability and interpretations of findings (Contractor & Lorange, 1988; Harrigan, 1988).

Auster (1992) cautioned researchers to be mindful of industry effects and noted that joint ventures have proliferated in growing industries but that nonequity alliances involving technological links have been predominant in emerging industries. We selected joint ventures operating in the electronics industry, regardless of the parent firms' industrial origins. Within this industry, our sample of joint ventures included those involved in computers and peripheral equipment, electrical or electronic components and equipment, aircraft parts, and measurement and medical equipment. An attractive feature of the electronics industry is its scope and pervasiveness. The industry is often likened to a food chain—the survival of each unit is critical to that of all of the other units.

We selected joint ventures with at least one U.S. partner that were started between 1979 and 1988 and observed them through September 1995. Thus, the period of observation was lengthy. Joint ventures that failed to get off the ground after their initial announcements were excluded. Moreover, only joint ventures that had no predetermined time of termination were selected.

The sample included newly initiated operations in which the U.S. partner owned between 10 and 90 percent of the joint venture equity.[1] This range is consistent with the definition of joint venture the U.S. Department of Commerce uses. Finally, we excluded multiple-party joint ventures and joint ventures that involved simple ownership restructuring.[2] Hladik (1985) argued that such restructurings are more akin to the liquidation of holdings by one company than to the formation of a new entity.

Data Collection

The initial list of joint ventures meeting our criteria was generated using the information from the *Cambridge Yearbook on Corporate Mergers, Joint Ventures and Corporate Policy* (1979–88), *Mergers and Acquisitions,* and the *Frost and Sullivan (F&S) Index (U.S., International, Europe)*. Data on each sampled joint venture were then compiled from the original articles referenced in the *F&S Index, Wall Street Journal Index, Business Periodicals Index,* and *New York Times Index*. We identified each citation of a partner in a sampled joint venture made in any index. Citations were collected from five years before a venture's formation through September 1995, or up to the time of the particular joint venture's termination. Firm-level data were acquired from Q-File, a collection of data from 10-K reports, annual reports, and proxy statements; the *Million Dollar Directory; Standard & Poor's Industrial Reports;* and *Moody's Corporate Report*. We obtained supplemental data from company publications and other public sources and from direct telephone inquiries to the top managers of the firms involved in the study.

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[1] Hladik followed the same definition (i.e., 10–90%), but the Harvard Multinational Enterprise Database reflects a broader definition (5–95%).

[2] We omitted this criterion for 9 joint ventures including three partners. In these joint ventures, each of the two main partners held between 40 and 60 percent of the equity, and the third party held less than 5 percent.

We initially identified 430 joint ventures formed between 1979 and 1988 in the electronics industry, 186 of which met the criteria discussed earlier. The sample included 137 cross-border and 49 domestic (U.S.-U.S.) joint ventures.

Variables and Measures

The dependent variable—the duration of a joint venture—was measured as the number of years and months from formation to dissolution. Following previous studies (Kogut, 1989; Porter, 1987), we used liquidation or sale to a third party as the operational definition of dissolution. Surviving or acquired joint ventures were treated as censored cases. To make sure that dissolution was an unexpected event, we excluded joint ventures for which initial contracts specified a period of operation or included an option for governance change, such as acquisition by one of the partners. We further confirmed the unexpectedness of dissolution by contacting managers in the U.S. parent firms of the dissolved ventures.

In the literature, disagreements exist on whether the acquisition of a joint venture implies the failure of its activities (Geringer & Hebert, 1991; Parkhe, 1993a). Acquisition, or internalization by one of the partners, may represent the realization of an investment option (Bowman & Hurry, 1993; Kogut, 1991). This interpretation suggests that a joint venture provides a strategic option in the course of growth that cushions the downside risk of future investments (Bowman & Hurry, 1993). Even though an acquisition is not tantamount to failure because it may reflect mutual satisfaction with a venture's having met both partners' goals, acquisition can provide a broader interpretation of joint venture performance. In the context of Japanese-U.S. joint ventures, acquisitions might be a more acceptable mode of termination as they may permit the continued learning of competencies within partnerships.[3] Thus, to compare the causes of the two modes of termination, we also examined acquisition as a measure of joint venture performance.

We followed the model introduced by Kogut and Singh (1988) to measure cultural distance. Using Hofstede's indexes, they developed a composite index based on the deviation along each of the four cultural dimensions—power distance, uncertainty avoidance, masculinity/femininity, and individualism—of each country from the United States ranking. The deviations were corrected for differences in the variances of each dimension and then arithmetically averaged.[4] We used a dummy variable to com-

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[3] We are indebted to an anonymous reviewer for suggesting this line of argument.

[4] The algebraic formula is as follows: $CD_j = \sum_{i=1}^{4} [(I_{ij} - I_{iu})^2 / V_i]/4$, where CD_j is the cultural distance of the jth country from the United States, I_{ij} stands for the index for the ith cultural dimension and the jth country, V_i is the variance of the index for the ith cultural dimension, and u indicates the United States.

pare U.S.-Japanese with U.S.-U.S. joint ventures (1 = U.S.-Japanese, 0 = U.S.-U.S.).

Considering the cultural diversity of other nationalities, we followed Ronen and Shenkar's (1985) synthesized country clusters to group non-Japanese cross-border joint ventures on the basis of the partners' cultural similarity. Ronen and Shenkar used individual-level data on attitudes and values to cluster various countries according to cultural similarity. Examples of these attitudes and values include those toward achievement, practical mindedness, sharing information, taking initiative, democratic leadership styles, and commitment to an organization. Ronen and Shenkar developed eight clusters, of which we used six: Anglo, Germanic, Nordic, Latin European, Latin American, and Far Eastern. To correct for small numbers of observations, we placed the two Nordic ventures in our sample in the Germanic cluster (henceforward called the North European cluster) and merged the two Latin American ventures with the Latin European cluster. Various studies have provided support for combining the Nordic and the Germanic clusters (Hom, DeNisi, & Kirchner, 1985; Haire et al., 1966) and the Latin American and Latin European clusters (Hofstede, 1980). We used a dummy variable for each group of cross-border ventures, adding a variable for Japan (which was not allotted to a cluster in Ronen and Shenkar) to compare each other bloc with U.S.-U.S. ventures. Recognizing the difference between Hofstede's and Ronen and Shenkar's cultural classifications, we also used regional group scores to test the effect of cultural distance, assigning an averaged composite index for each region to each company in that region.

The number of independent geographical and product subsidiaries in the parent firms was used to define each firm's scope of operation. The typical Standard Industrial Classification (SIC) measure of degree of diversification is not an appropriate measure of scope because it is based on product diversification only. Firms can grow by volume or geographical expansion domestically and internationally (Chandler, 1962), and an SIC-based diversification measure is not sensitive to such growth. Hence, we used the absolute difference in two partners' number of subsidiaries to measure their difference in product-market scopes.

Size differences were measured as the ratio of the logarithmically transformed three-year average sales of the larger partner to that of the smaller partner. Previous studies (e.g., Kimberly, 1976) have used this ratio as a fair approximation of size distance. We recognize some pitfalls in defining the boundaries of Japanese firms, which may be members of larger industrial groups such as keiretsu. Intercompany sales and transfer within these groups can complicate the measurement of the sales of an individual firm (Shan & Hamilton, 1991). However, given the difficulty of controlling for the effect of group affiliation, we accepted this limitation on our findings and interpretations. Even so, our approach is comparable to previous approaches to estimating Japanese partners' sizes (Osborn & Baughn, 1990; Shan & Hamilton, 1991). The three-year average sales of the U.S. partners varied from $0.74 million to $65 billion, with the median value at $1.2 billion; those of the

foreign partners ranged from $3.7 million to $41 billion, with the median value at $1.4 billion. The wide variation in size shows that large-firm bias is not a problem in this study.

Age distance indicates the absolute value of the difference in partners' life spans calculated by subtracting the founding years from 1995. The average distance was 38 years, and overall distances ranged from 11 to 228 years for U.S. firms and from 18 to 137 years for foreign firms.

We represented direct competition between partners as a dummy variable using the partners' four-digit SIC codes. For joint ventures in which the parent firms' primary operations were the same, the dummy was set to 1; when primary operations were different, the variable was coded 0. The relationship of the joint ventures to the parent firms' operations (i.e., operational overlap) was also represented as a dummy variable (1 if the primary operation of the joint venture overlapped with both partners' current product-market scopes, 0 otherwise). The dummy variable for technology transfer represents joint ventures that involve technology transfer from the partners for venture operations (1 = technology venture, 0 = nontechnology venture).

Control Variables

We controlled for possible confounding effects by including several relevant variables in the analysis. In joint ventures, familiarity and trust are developed through repeated or prior experiences between the partners (Gulati, 1995). Trust evolves relatively easily as partners develop mutual understandings from prior collaborative experiences. Opportunistic risks are obviated by partners' anticipation of repeated transactions in the future or by their respect for transactions that occurred in the past. Arguably, prior relationships may encourage partners to behave with guile, but we suggest that this is less likely to occur than is trusting behavior on account of concern for reputation, broadly accepted norms of conduct, and conventions that emerge from repetitive interactions (North, 1990). Also, when partners know each other's strengths and weaknesses, they can manage better coordination and minimize bureaucratic complexity in the management of collaboration. Prior experiences between partners that leave them disposed toward potential cooperation in anticipation of building better relationships may in fact negate such destabilizing influences as cross-cultural differences. Therefore, we closely examined the possible interactive effects of prior experiences with other study variables. Prior relationship was coded 1 if two partners had had a cooperative relationship during the five years prior to the current joint venture and was otherwise coded 0.

Equity sharing, reflecting the division of control according to ownership structure, has been studied as a critical determinant of the dissolution of joint ventures (Blodgett, 1992; Kogut, 1988). A dual-ownership joint venture (50-50 equity sharing) is most likely to experience unexpected difficulties since extensive communication is necessary to reach a decision. In a joint venture in which one party has dominant ownership, the other party knows that pursuing its individual interests may be difficult. We used a

dummy variable coded 1 for a 50-50 joint venture and 0 for unbalanced equity sharing.

Boris and Jemison (1989) indicated that the scope of operation affects the degree of difficulty in controlling and coordinating resource flows within a joint venture. We measured the scope of operation in terms of domestic versus international marketing and single versus multiple products or projects. Joint ventures involving multiple markets or products are more difficult to manage and less stable than ventures that target domestic (in one or both partners' countries) markets or involve a single product or project. We used two dummy variables, respectively coded 1 when a joint venture targeted markets in multiple countries or involved multiple products or projects. We also controlled for industry differences by using dummies for the four categories (all within the overall electronics industry) from which the ventures were selected.

Data Analysis

Event-history analysis was used because it is uniquely suited to studying a time series of discrete events for right-censored data: cases for which an event has not occurred by the end of the study period are also amenable to analysis. The unit of analysis was a joint venture, and an event was registered when a joint venture was dissolved. We used an accelerated event-time model and a maximum likelihood technique to test the hypotheses. The accelerated event-time method is based on the assumption that the duration of joint venture survival follows a parametric baseline distribution, with all independent variables held at zero (Kalbfleisch & Prentice, 1980). Then, the effects of covariates are estimated as exponentially multiplicative accelerations or decelerations of the baseline distribution. In other words, the duration of a joint venture (T_i) determined by dissolution is the dependent variable for joint venture i and has a logarithmically linear (log-linear) relationship to the kth independent variable (X_{ki}). Thus,

$$\ln T_i = \alpha + \beta_k X_{ki} + s\epsilon_i,$$

where ϵ_i is the disturbance term, α is an overall intercept term, and s represents a scale factor associated with the underlying distribution. A positive β accelerates the baseline distribution of event times, and a negative coefficient decelerates the distribution. In the results reported, therefore, a positive coefficient estimate indicates an increase in expected duration occurring as a function of the covariate. Thus, given the same prior duration, matches with a higher value of the covariate would have higher probability of continuing the match in the following year (Levinthal & Fichman, 1988: 358). However, following this procedure did not allow us to make conclusions about changes in the hazard rate $(h[t])$, since the hazard rate is nonmonotonic with respect to time. Accelerated event-time analysis requires specifying the underlying parametric distribution prior to hypothesis testing. In our prior testing, logarithmically normal (log-normal) distribution provided a better

fit (at $p < .01$) to our data than exponential, Weibull, and logarithmically logistical distributions. The log-normal distribution follows an inverted U-type of hazard distribution over time, which is specified as

$$h(t) = \frac{\exp - \{[\log(t) - \mu]^2/2\sigma^2\}}{[(\sqrt{2\pi})\sigma t] \left(1 - \Phi\{[\log(t) - \mu]/\sigma\}\right)},$$

where Φ is the cumulative distribution function for the normal distribution. We applied the SAS Lifereg package to conduct the event-history analysis using a log-normal model.

RESULTS

Table 1 presents the means, standard deviations, and Pearson product-moment correlations of the variables. The joint ventures in the data set experienced a 43 percent dissolution rate and a 4.97-year average life span. At the end of the study period, only 27 joint ventures were surviving: 78 joint ventures (42%) had been acquired by one of the partners. An initial evaluation of the Pearson product-moment correlations revealed the following: duration was negatively correlated with the economic variables (operational overlap, competitive ventures, and technology ventures), age difference, and broad market coverage and positively correlated with prior relationship. It was also negatively correlated with dissolution at $p < .01$, implying that the longer a venture persisted, the less likely it was to fail. However, duration was positively correlated with cultural distance, contrary to Hypothesis 1a. The matrix showed no substantial problem with multicollinearity among the independent variables.

Table 2 presents the results of the log-normal regression analysis testing our hypotheses. In Hypothesis 1a, we predict that greater cultural distance is related to the dissolution of joint ventures. With the effects of the other variables controlled, the results from model 1a indicate that the relationship is significant at $p < .05$, but the effect is in the direction opposite that predicted by the hypothesis. Our results suggest that larger cultural distances were related to a lower joint venture dissolution rate. In Hypothesis 1b, we predict that U.S.-Japanese joint ventures will be less likely to dissolve than U.S.-U.S. joint ventures. Model 1b compares the U.S.-Japanese joint ventures and those between the United States and other cultural clusters with the U.S.-U.S. joint ventures. The results indicate that the U.S.-Japanese joint ventures lasted longer than the domestic (U.S.-U.S.) joint ventures ($p < .05$), but none of the other clusters showed a significant relationship at $p < 1$.[5] The average life span of the U.S.-Japanese ventures was 6.44 years, but the U.S.-U.S. and the U.S.-Anglo ventures did not last more than 4 years. The

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[5] The results are consistent whether the U.S.-Japanese joint ventures are compared with the U.S.-U.S. or the U.S.-Anglo ventures.

TABLE 1
Descriptive Statistics and Correlations[a]

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12
1. Duration of venture	4.97	3.33												
2. Dissolution	0.43	0.49	-.22											
3. Cultural distance	1.52	1.42	.33	-.08										
4. Scope differential	30.80	31.79	.02	-.11	.09									
5. Size differential	1.15	0.86	-.02	-.02	-.09	-.08								
6. Age differential	36.92	26.54	-.16	.09	-.18	-.09	.03							
7. Operational overlap	0.25	0.43	-.25	-.05	-.15	-.03	-.05	.05						
8. Competitive ventures	0.22	0.41	-.14	.12	-.01	-.12	.09	.04	.05					
9. Technology ventures	0.71	0.45	-.19	.02	-.14	-.08	.12	.14	-.19	.01				
10. Prior relationship	0.26	0.43	.18	-.07	.12	.08	.02	-.06	.03	-.02	-.07			
11. Equal equity sharing	0.53	0.50	-.07	.08	-.12	-.15	-.11	.01	.03	.03	-.03	.01		
12. Broad market ventures	0.41	0.49	-.17	.17	-.01	-.07	-.07	.07	.07	.12	-.07	.01	-.08	
13. Multiple product ventures	0.58	0.49	.03	-.05	-.08	.09	-.07	.04	.16	-.05	-.08	.12	-.09	.13

[a] Correlations with an absolute value of .14 are significant at the .05 level.

TABLE 2
Log-Normal Regression Results for the Dissolution and
Acquisition of Joint Ventures

Variables	Model 1a b	Model 1a s.e.	Model 1b b	Model 1b s.e.	Model 1c b	Model 1c s.e.	Model 1d b	Model 1d s.e.
Partner nationality								
Cultural distance	0.13*	.06			0.10	.08		
Regional bloc score							0.14*	.06
Cultural distance × prior relationship					0.20*	.09		
Regional bloc score × prior relationship								
U.S.-Anglo ventures			−0.03	.28				
U.S.-North European ventures			0.34	.33				
U.S.-Latin European ventures			0.19	.27				
U.S.-Far Eastern ventures			0.84	.53				
U.S.-Japanese ventures			0.43*	.21				
Organizational variables								
Scope differential[a]								
Size differential								
Age differential[a]								
Economic motivation								
Operational overlap								
Competitive ventures								
Technology ventures								
Control variables								
Prior relationship	0.50*	.19	0.48*	.20			0.48*	.20
Equal equity sharing	−0.26	.17	−0.29†	.16	−0.27	.17	−0.30†	.17
Multiple market ventures	−0.59***	.17	−0.55**	.18	−0.57***	.17	−0.58**	.16
Multiple product ventures	0.17	.18	0.04	.17	0.11	.16	−0.04	.17
Intercept	2.04***	.45	2.06***	.45	2.12***	.46	2.07***	.45
Log-normal scale factor	.89***	.07	.89***	.07	.90***	.07	.89***	.07
Log-likelihood ratio	−155.56		−154.93		−156.19		−155.60	
2 × Δlog-likelihood ratio[b]	4.87*						4.80*	

[a] Values are multiplied by ten.
[b] Compared to the model with only control variables.
   † $p < .10$
   * $p < .05$
  ** $p < .01$
 *** $p < .001$

U.S.-U.S. and the U.S.-Anglo ventures also showed much higher dissolution rates, 49 and 52 percent, respectively, than the U.S.-Japanese ventures (39%).

Hypotheses 2–4 contain predictions on the effects of selected organizational variables. The addition of scope, size, and age differentials did not improve the model's fit, implying insignificant effects on the dissolution of joint ventures. A chi-square test indicated that model 2 provided no significant improvement in the logarithmic-likelihood ratio at the $p < .1$ level, compared to the model with only control variables. None of the variables representing differences in partners' organizational contexts received significant support at $p < .05$.

TABLE 2 (continued)

									Acquisitions			
Model 1e		Model 2		Model 3		Model 4		Model 5		Model 6	
b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.	b	s.e.
						0.09	.06			0.16**	.06
0.11	.07										
0.17*	.08										
								−0.04	.27		
								−0.10	.29		
								0.13	.23		
								1.13*	.53		
								0.58**	.21		
		−0.00	.02			−0.00	.02			−0.00	.02
		−0.01	.09			−0.04	.09			−0.05	.09
		−0.05†	.03			−0.04	.02			0.03	.02
				−0.37*	.18	−0.31†	.18			−0.64***	.17
				−0.32*	.16	−0.35*	.16			−0.10	.18
				−0.40*	.17	−0.29†	.16			−0.63***	.17
		0.60**	.19	0.55**	.18	0.49**	.19	0.33*	.18	0.36*	.16
−0.27	.17	−0.34†	.18	−0.33*	.16	−0.27†	.16	−0.04	.16	−0.05	.15
−0.57***	.17	−0.60***	.17	−0.54***	.16	−0.49**	.16	−0.00	.17	−0.12	.15
0.08	.17	0.06	.17	0.05	.16	0.07	.15	−0.16	.17	−0.09	.15
2.15***	.46	2.34***	.48	2.65***	.44	2.43***	.48	1.59***	.40	2.30***	.44
.90***	.07	.90***	.07	.85***	.07	.83***	.06	.86***	.07	.79***	.06
−156.75		−156.04		−152.16		−150.06		−150.34		−140.47	
			3.92		11.68**		15.88*				34.26***

Hypotheses 5–7 contain predictions about the effects of economic motivational variables. Model 3 provides strong support for these hypotheses; a chi-square test showed significant model improvement at $p < .01$ over the model with only control variables. Competition between partners, operational overlap, and technology transfer are all negatively related with the dissolution of the joint ventures at $p < .05$, as predicted in Hypotheses 5–7. These results imply that a joint venture is more likely to dissolve when it is between competitors, when its product-market scope overlaps with the parent firms' current operations, and when it requires technology transfers from the parent firms. We further explored the effects of operational overlap in cross-border joint ventures by using two separate dummy variables for U.S. partners and foreign partners. The results are significant for both variables at $p < .05$, suggesting that operational overlap has a consistent and significant effect on dissolution regardless of the partners' national origins.

In regard to the control variables, prior relationship and multiple ventures are consistently significant at $p < .05$. As expected, prior relationship

has a negative effect on dissolution, but multiple market venture has a positive effect. There is also some support for equal equity sharing, implying that 50-50 ventures are more likely to dissolve than other ventures. The multiple product venture and industry dummies are consistently insignificant. Because of space limitations, we do not list the industry dummy variables. The insignificant industry effects may be due to the similarities among the four industry categories from which the joint ventures were drawn. Because the four categories all belonged to a broadly defined electronics industry, there was some degree of homogeneity in products and competitive situations.

To check the sensitivity of results, we reanalyzed the models (1a, 1b, 2, 3, and 4) controlling for an interactive effect between prior relationship and other variables.[6] With the exception of a result for cultural distance, no significant changes were obtained from the reanalyses. In model 1c (a reanalysis of model 1a), the effect of cultural distance on joint venture dissolution became insignificant, and the interaction term became significant at $p < .05$. This significant interaction effect implies prior relationship may be able to negate the conflict and misunderstanding caused by cultural distance between cross-border partners.[7] We checked the robustness of models 1a and 1c by testing models 1d and 1e, using regional distance scores instead of cultural distance; results were highly consistent with those for models 1a and 1c. For the composite model (model 4) controlling for other study variables, findings were similar to those for model 1a.

Although our hypotheses refer to the termination of joint ventures through dissolution, models 5 and 6 present a reanalysis with acquisitions coded as events and all other outcomes censored (including dissolutions). These results allowed us to compare the causes of the two modes of termination. In model 6, cultural distance is significant at $p < .01$ and promotes the longevity of ventures. However, when foreign partners are regrouped according to cultural clusters (model 5), only U.S.-Japanese and U.S.-Far Eastern ventures become significant. The significance for U.S.-Japanese ventures across different measures of performance suggests that these ventures have a lower probability of termination and last longer than domestic (U.S.-U.S.) ventures. The termination rates (including both dissolutions and acquisitions) are 69 percent for U.S.-Japanese and 94 percent for U.S.-U.S. ventures. Even though we were constrained by the small number of apposite cases in the sample (one acquisition and two dissolutions in the U.S.-Far Eastern

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[6] We did not include prior relationship in these models to avoid multicollinearity problems. The correlation between prior relationship and the interaction term was significant at $p < .001$. We also repeated the analyses for models 1b, 2, and 3 by entering the interaction terms one at a time with each variable.

[7] Considering the possibility that cultural distance becomes insignificant because of multicollinearity, we reanalyzed the model (model 1c) following the backward elimination procedure and the chi-square test. When cultural distance was not included, the chi-square test showed no significant change in the log-likelihood ratio at $p < .1$.

bloc), the results suggest that U.S.–Far Eastern ventures are less likely than U.S.-U.S. ventures to be acquired by one of their partners (model 5), but they are no less likely to be dissolved than are U.S.-U.S. ventures (model 1b). Since U.S.–Far Eastern ventures are typically buyer-supplier relationships (six of the seven joint ventures fit this profile), there would be little economic rationale for acquisition.

In the reanalysis, the organizational variables again had no effect on the prospect of termination through acquisition. Economic motivation also showed similar results, a strong overall effect on the likelihood of acquisition. However, the insignificant result for competitive ventures implies that conflicts between competitive partners lead to dissolutions, but not acquisitions. Mindful of the hazards of losing firm-specific know-how to competitors, competitive partners tend to dissolve joint ventures rather than allow each other to take them over (cf. Park & Russo, 1996). Among the competitive ventures ($n = 41$), the rate of termination through dissolution (51%) is much higher than that through acquisition (34%); however, the acquisition rate is higher than the dissolution rate for operational overlap ($n = 47$, 53 vs. 36%) and technology transfer ($n = 132$, 47 vs. 43%).

Prior relationship is again significant, suggesting that prior experiences between partners promote longevity in joint ventures. However, there is a drastic change in the results for multiple market ventures. Partners are more likely to terminate multiple market ventures through dissolution than through acquisition; the dissolution rate for multiple market ventures is 53 percent, which is much higher than the acquisition rate, 38 percent. Given the complexity of multiple market ventures, it would be more difficult for partners to reach an agreement to internalize them, and dissolution would appear to be less difficult to execute. For similar reasons, 50-50 joint ventures would be more difficult for one partner to internalize; the dissolution rate was 47 percent, the acquisition rate, 38 percent.

DISCUSSION

A popular belief in both academic and business quarters is that cross-border joint ventures are more unstable than national joint ventures. This belief is not supported in our study. In fact, the reverse appears to be the case: cross-border joint ventures with partners from culturally distant countries have longer durations and are less likely to end. This pattern was generally consistent across two different modes of termination, dissolution and acquisition. An enlarged transaction cost framework and empirical tests suggest that prior relationships between firms may provide a powerful counterbalance to cross-cultural differences. This result is consistent with Harrigan's (1988) findings, with Bleeke and Ernst's (1993) case study result that cross-border joint ventures can overcome early difficulties caused by cultural differences, and with Barkema, Bell, and Pennings's (1996) suggestions that learning between partners may offset cultural differences. Prior relationships between partners create trust and familiarity (Gulati, 1995; Kogut, 1989; Park & Russo, 1996). Trust attenuates opportunistic behaviors and can facili-

tate conflict resolution. Familiarity enhances a partner's transparency and can reduce the costs of monitoring its activities.

In our assessment of cultural blocs, our results indicate that U.S.-Japanese joint ventures are less likely to dissolve than national joint ventures (those between U.S. firms) and that there are no significant differences between U.S.-U.S. joint ventures and those involving the United States and other Western, mostly European, firms. Beyond the significant effect of prior experience, few empirical facts bear on this pattern of results. Even so, a number of explanations can form the basis of future inquiries. Within the Japanese culture, specific values engender trust, learning, and long-term horizons—all of which favor the stability of alliances. Within a transactional cost framework, cooperation is particularly salient when individuals have numerous opportunities to interact with each other and therefore base their cooperation on reciprocity. Therefore, independent of formally stated financial goals, Japanese firms seek joint venture stability in order to enhance their reputations in anticipation of future interactions with other foreign firms (Axelrod, 1984; Parkhe, 1993a). Among American partners, there are strategic reasons for them to be particularly attentive to such ventures, given the size of the Japanese market, the growth potential of this market throughout the 1980s, and the high barriers blocking distribution networks. Given the potential benefits that arise from operating in a global environment and the highly publicized risks of working with Japanese firms, it is also possible that partners in a U.S.-Japanese joint venture may enter the cooperative relationship with more caution, deliberation, and purposefulness than those entering a venture restricted to domestic operations. Anecdotal accounts critical of Japanese-American joint ventures tend to emphasize the disparity of the economic goals of partners from the two countries (cf. Reich & Mankin, 1986). Our study suggests that mutual reciprocity and anticipated interactions provide the foundation for stable partnerships.

In our study, differences in partners' strategic diversity (i.e., operational breadth and scope), size, and age did not affect duration and the prospect of joint venture dissolution. We offer three explanations for these results. First, the asymmetry between small and large firms might not have been captured sufficiently. The descriptive data showed little variation in partners' sizes, particularly for the cross-border joint ventures (the average ratio was 1.03 for cross-border and 1.43 for U.S.-U.S. ventures). Given these small variations in size, our measure of distance might not have been sensitive enough to capture the true size differentials. A second reason is that, as Doz (1988) and Killing (1983) suggested, coordination difficulties between asymmetric partners may be overcome by an a priori understanding that the dominant partner is likely to take the initiative in defining substantive issues and may take greater responsibility for their outcomes (Harrigan, 1988; Kogut, 1988). A third reason is that the effects of the focal organizational variables may not have emerged over the study period. A joint venture is a hybrid of independent firms, and the partners' organizational characteristics impinge on its operations, but it may take time before these characteristics are mani-

fested in scope, size, and age. The organizational variables can be reexamined in the future.

Consistent with the transaction cost paradigm, this study reaffirms the importance of economic motivation for a stable and enduring cooperative relationship. The study indicates that partnerships between direct competitors, those with significant operational overlaps, and those that involve technology transfers are less likely to endure. Rivalry and duplication of activities within a joint venture, or eroding specialization, may be signals of early and premature dissolution. Ambiguities arising from equal equity sharing (Blodgett, 1992) can also exacerbate managerial complexities and coordination efforts, leading to dissolution. Multiple market ventures have a higher chance of dissolution because their interests are multiple and extensive postcontractual monitoring is needed to regulate their activities. The significance of the scope of market activities in relation to dissolution partly corroborates this idea, but the variable for scope of products and projects was not significant. The adverse effects of direct competition, operational overlap, and technology transfers tend to be accentuated in cross-border joint ventures.[8] This may suggest that, even when conditions favor lower transaction costs in international joint ventures (Buckley & Casson, 1988), such economic and competitive characteristics override institutional values that promote cooperation.

In closing, our findings and interpretations have to be tempered by the limitations of the study. First, this study limited its focus to only one type of interfirm collaboration, joint ventures. Future studies should explore whether our results hold for nonequity strategic alliances as well. Second, the hypothesized relationships and conceptualization in this study were developed specifically to predict the dissolution (and longevity) of joint ventures. By focusing on longevity and dissolution, however, it is likely that we overlooked other factors that determine the success and failure of joint ventures. Researchers should develop more reliable and comprehensive measures, focusing on both objective and subjective measures of joint venture performance, to fully evaluate the effectiveness and consequences of U.S. firms' collaboration with international and domestic partners. Further, more direct measures of values that are specific to a partner's behavior toward its domestic and foreign partners in a cooperative relationship would be helpful for understanding the effects of interpartner differences in national culture and organizational context on the dissolution of joint ventures. The joint ventures studied also involved at least one U.S. partner. National or cross-border joint ventures involving non-U.S. firms may lead to different conclusions, as Barkema, Bell, and Pennings (1996) illustrated.

Despite these caveats, we suggest that our results have important implications for managers. The stability of cross-border joint ventures may ultimately

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[8] An additional analysis indicated that the economic variables were significant only for cross-border joint ventures and insignificant for national (U.S.-U.S.) joint ventures.

depend on their participants' ability to understand, access, and adopt innovative practices that can mitigate the compounding effects of cultural differences. Myths and flawed beliefs may simply accelerate the demise of these joint ventures.

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EFFECTS OF TRUST AND GOVERNANCE ON RELATIONAL RISK

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In transaction cost economics, trust has been treated as redundant or
even misleading. This study tested the effects of governance and trust
on the risk perceived by agents of firms in alliances. Two dimensions of
relational risk were assessed: the probability that something will go
wrong and the size of the loss incurred when it does. Hypotheses, tested
with survey data on the customer relations of ten suppliers of electrical/
electronic components, were well corroborated, with trust-related vari-
ables as well as others found to have significant effects.

Widespread competition in world markets, the increasing importance of
fixed costs (Ohmae, 1989), rapid technological development, and the rising
complexity of input and output markets (Zuscovitch, 1994), have made mar-
ket competition increasingly like a race. To have a chance of winning this
race, firms must concentrate on their core competencies (Prahalad & Hamel,
1990). To do this, they need alliances with other firms that allow them (1) to
share fixed costs (of, for instance, R&D, production, and distribution and
sales), (2) to share the risks of development, (3) to enhance their own core
competencies, (4) to acquire access to complementary competencies (Porter
& Fuller, 1986), and (5) to increase speed of market entry (Lei & Slocum,
1991). Hence, the design and implementation of alliances are vital. Early
researchers paid much attention to the control of alliances, in order to cover
the risks involved in cooperation between firms with different objectives;
more recent researchers have found that excessive concern with control can
be counterproductive (Lorange & Roos, 1992), that the management of alli-
ances is critically concerned with attitudes and interpersonal relationships
(Faulkner, 1995), and that attention should be paid to issues of trust (Barber,
1983; Killing, 1988; Lorenz, 1988; Palay, 1984). The purpose of the reported
study was to extend that line of research.

"Alliance" is a broad term capturing many forms of interfirm cooperation that go beyond market tranactions. Explanations of alliances in the literature focus on the trade-off between the perceived advantages of full ownership, market contracts, and intermediate positions (Contractor & Lorange, 1988; Hagedoorn, 1993; Osborn & Baughn, 1990). Prominent approaches to the systematic comparison of the various forms that interfirm alliances can take (such as long-term purchasing agreements, licensing, collaboration on R&D, technology exchange, and joint venture) are the strategic behavior perspective (Kogut, 1988; Porter & Fuller, 1986), the theory of international production (Dunning, 1995), and transaction cost economics (Gulati, 1995; Hennart, 1988).

Alliances entail problems of coordination and mutual dependence. Transaction cost economics in particular has focused on these problems. Chiles and McMakin (1996) distinguished two perspectives in transaction cost economics. The first is a long-term evolutionary perspective in which objective transaction costs determine the survival of the fittest governance forms. The second is a short-term managerial choice perspective in which managers act on subjective costs that are based on varying perceptions and evaluations of risk. The latter explains why firms in similar circumstances may make different make-or-buy trade-offs. We took the latter perspective.

According to transaction cost economics, dependencies are the result of switching costs, which arise from specific investments, investments worth less or nothing outside a given alliance (Williamson, 1975). Although the objective of a partnership is joint creation of value, there is a fiduciary risk of opportunistic exploitation of dependence. This risk may lead partners to integrate activities in a single firm, which offers better control of opportunism (Joskow, 1985; Williamson, 1975), through sales of assets, a merger or an acquisition, or an equity joint venture.[1] But a nonintegrative contractual alliance between different firms has advantages over integration: the strong incentives experienced by separate firms responsible for their own survival, the economies of scale realized in production by specialized firms (Williamson, 1975), and great flexibility in the configuration of scope, which indicates efficiencies from cost sharing between products.

But such alliances raise complicated issues of governance as they are "hybrid" forms of organization between market and hierarchy (Williamson, 1991). The fiduciary risks of dependence, corresponding problems of coordination, and problems of spillover need to be dealt with. Daems (1983) discussed different forms of governance in different industries; Lei and Slocum (1991) compared licensing, joint ventures, and consortia; Osborn and Baughn (1990) contrasted joint ventures and contractual modes for international alliances; Walker and Poppo (1991) compared coordination mechanisms between and within organizations; Walker and Weber (1987)

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[1] In the following, we use joint venture to refer to an equity joint venture, which is a new firm set up with equity supplied by parent firms.

discussed adjustment, switching, and transaction costs; and Teece (1986) studied problems of spillover, the role of complementary assets in innovation, and implications for integration, licensing, and collaboration. Grandori (1995) attempted to systematically inventory governance forms under different conditions.

Traditionally, approaches from economics have focused on the roles of self-interest and opportunism. The threat of opportunism has to be taken into account, and means of constraining opportunism include contracts and monitoring, which Williamson (1975) called "legal ordering"; incentives such as shared ownership of specific investments; restraint of opportunism to safeguard future profits yielded by cooperation (Axelrod, 1984; Heide & Miner, 1992); and a reputation mechanism, or posting of hostages, which Williamson (1985) called "private ordering." In early work, Williamson (1975) recognized the relevance of "atmosphere," but he did not further develop this notion in his later work (Williamson, 1985). Williamson (1993) posited that trust makes sense only if it goes beyond calculative self-interest, but since he maintained the centrality of calculativeness, there is no room in his view for trust. In other research traditions, notably the work of the Industrial Marketing and Purchasing Group (IMP), trust is a central variable (Easton, 1989; Håkansson, 1982, 1987, 1989; Johanson & Mattsson, 1987). But in that perspective, trust is viewed as so pervasive that the role of self-interest and the temptations of opportunism are ignored. In various other studies, trust has been viewed as the glue that keeps business partners together (Barber, 1983; Killing, 1988; Lorenz, 1988; Palay, 1984). Our perspective is that trust and opportunism both play roles, and that trust, coercion, and incentives are all relevant dimensions of goverance (cf. Buckley & Casson, 1988).

In addition to limiting transaction costs, trust may also form part of the utility of a relationship. According to social exchange theory (Blau, 1964), exchange and cooperation often have a social dimension (intrinsic utility) as well as an economic dimension (extrinsic utility). Economists tend to think of value in exchange as something that exists independent of a transaction. As Murakami and Rohlen noted, "The value of the relationship itself is typically ignored and the impersonality of the transaction is assumed" (1992: 70). In intrinsic utility, the exchange process itself matters, as does the economic surplus that the exchange yields. Buckley and Casson (1988) also recognized the significance of the exchange process. People may prefer to transact on the basis of trust and its sources: ethics, kinship, friendship, and empathy. Social exchange relies more on unspecified, implicit obligations, which depend on shared systems of meaning, belief, and ethics, than on formal contracts. The idea that exchange includes noncontractural elements goes back (at least) to Durkheim.

The economic relevance of trust is that it reduces the specification and monitoring of contracts, provides material incentives for cooperation, and reduces uncertainty (Hill, 1990). Transactions are thus cheaper, more agree-

able, and more flexible. With detailed formal contracts, it is more difficult (slow and costly) to modify terms when conditions change. Apart from its own worth, trust pays. But it also carries the risk of betrayal.

The purpose of the present study was to extend the transaction cost framework to address trust and to test that extended framework empirically. More specifically, we sought to determine (1) whether the instruments for governance posited in transaction cost economics as related to coercion (contracts, monitoring, hostages) and to incentives (long-term perspective, reputation, reciprocal dependence) have an effect on perceived relational risk, and (2) whether trust also has a significant effect on relational risk. Finding such an effect would falsify the claim of previous theory that trust is a redundant concept.

For an empirical test, this study focused on a particular type of alliance: the buyer-seller dyad. The extensive literature that has developed is chiefly based on the marketing channels paradigm, resource dependence theory, transaction cost economics reasoning, and relational contract theory (Heide, 1994). Some researchers have paid attention to the degree of partners' closeness, a concept with multiple facets, including cooperation, collaboration, commitment, joint action, and expectations of continuity (Anderson, 1996). Our work belongs to this stream in the literature, but it more explicitly combines insights from transaction cost economics with other factors. We saw trust between parties as shaping the evaluation of the risk of dependence stemming from, among other things, investments in relation-specific assets.

TRUST

To proceed, we first need to define trust and to specify a framework in which it fits with other aspects of governance. Trust may concern a partner's ability to perform according to the intentions and expectations of a relationship (competence trust) or his or her intentions not to defect (intentional trust; cf. Barber, 1983). Here, we focus on the latter type of trust. Of course, risks arising from failures of competence are important in subcontracting relations, but our focus was on the relation between intentional trust and cooperation. However, we did not ignore competence trust; the reliability of a partner's competence is included in the measure of the partner's value.[2]

It is useful to distinguish between behavioral trust, "the willingness to increase one's vulnerability to another whose behavior is not under one's control" (Zand, 1972: 230), from intentional trust, or the subjective probability that one assigns to benevolent action by another agent or group of agents (cf. Dasgupta, 1988; Gambetta, 1988; Mayer, Davis, & Schoorman, 1995). Behavioral trust can be based on intentional trust, but can also be based on other factors (such as a failure to recognize unilateral dependence), and the existence of intentional trust cannot be inferred from the presence of

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[2] For example, to evaluate a supplier we looked not only at quality, but also at quality assurance, and not only at delivery time, but also at delivery reliability.

behavioral trust alone (Craswell, 1993; Kee & Knox, 1970; Noorderhaven, 1995, 1996). Consequently, in order to use intentional trust as an explanatory variable, we had to measure it independently.

Since our focus was on relations between organizations, the question of the relation between the conduct of individuals and the conduct of firms arises. As Ring and Van de Ven (1994) argued, they are related by the roles individuals are assigned in organizations. Conduct "qua persona" is restricted and guided by organizational roles. Alignment between the two types of conduct can be a problem. If cooperation is founded on trust based on personal bonding, problems may arise concerning the exigencies of organizational role. Personal loyalty may deviate from organizational interest and may even lead to corruption or embezzlement. The development of personal ties that are too strong may need to be prevented by personnel turnover. Conversely, personnel change may lead to a breakdown of relations based on personal trust. Such considerations should be part of governance.

Our approach to the problem noted above was as follows. First of all, if trust is indeed a subjective probability assigned to conduct, it can logically apply to a subjective probability held by an individual with respect to the conduct of an organization. Of course, this subjective probability may, at least in part, be based on the experiences and perceptions of and constraints on members of the organization with which the focal individual's organization is related. Thus, we treated trust in terms of the relational risk with respect to a partner organization perceived by an individual who enacts the relation with the partner organization. This formulation yields the first in a series of propositions that structure our theoretical analysis: It makes sense to treat trust as a perception of an individual with respect to a partner organization. The argument implies that trust is not an objective condition and that it varies between individuals, even those in otherwise identical conditions.

DIMENSIONS OF TRUST

Williams (1988) proposed a scheme for the determinants of cooperation, which is reproduced as Figure 1. Williams argued that none of these sources by itself suffices, that, in cooperation, some mix will always be operative, and that no universally best mix can be specified. Often, trust will not suffice as a basis for cooperation. Conversely, material self-interest and coercion are seldom sufficient as a basis for cooperation: since one partner cannot fully control the other's conduct by threat and reward (cf. Deutsch, 1973), each needs trust to strengthen this fragile basis for cooperation (Ring & Van de Ven, 1994).

If trust is identified with a subjective probability that a partner will not abuse one's dependence, without further qualification, then anything that contributes to such subjective probability would belong to trust—anything that restrains the partner from opportunistic conduct. That would include the direct control that one partner may exercise over the other's conduct by

FIGURE 1
Sources of Cooperation

	Macro Level	Micro Level
Egotistic	Coercion or fear of sanctions from some authority (God, law)	Material advantage or interest
Nonegotistic	Ethics: Values/norms of proper conduct	Bonds of friendship, kinship, or empathy

Source: Williams (1988).

contract, monitoring, or threat (coercion). It would also include motives of self-interest that restrain the partner, such as the preservation of its reputation (Weigelt & Camerer, 1988), expectation of future rewards from cooperative conduct in the present (Telser, 1980), or the desire to protect hostages (Williamson, 1985). Indeed, these sources are often included in the notion of trust (e.g, Chiles & McMakin, 1996), and Williamson (1993) discounted as unnecessary any notions of trust not based on the promotion or protection of self-interest. However, we adopted a narrower notion of trust, as going beyond self-interest: an individual trusts someone if he or she believes the other is likely to cooperate even if the latter is not coerced to do so and has no direct material interest in doing so. There are two arguments for this view. One is that it corresponds more closely to intuitions: Is a perception really trust when one expects someone to conform to agreements out of self-interest or coercion? We agree with Williamson that trust makes sense only if it goes beyond calculative self-interest. Following Nooteboom (1996), we propose that an individual trusts someone when he or she is willing to *forego* guarantees based on coercion or self-interest. Only then does trust economize on transaction costs. This notion was the second reason we saw trust as we did: we wanted to investigate how causes beyond coercion and self-interest could affect relational risk. Thus, our second proposition is that trust is a source of cooperation that coexists with sources of cooperation based on self-interest and coercion. In Figure 1, trust is associated with the nonegotistic sources of cooperation; loyalty to a partner results from norms and ethics and from bonds of friendship or kinship rather than from coercion and material self-interest. Thus, proposition three is that one dimension of trust is the institutionalization of values and norms that constitute an ethics of transactional relationships. It would not be justified to say that the recognition of such institutions is absent from traditional transaction cost economics. Williamson (1991), for example, recognized the effect of the "institutional environment" on transaction costs, but under the assumption that such an environment applied equally to all actors in a given context or national culture. This assumption does not serve to distinguish between alternatives of governance

structure ("institutional arrangements") within a given context. We disagree for two reasons. First, susceptibility to values and norms (which we take to be part of the institutional environment) is likely to differ between individuals and between organizations, as a function of organizational culture. Thus, the impact of values and norms may vary within national boundaries (cf. Noorderhaven, 1995). Second, institutions may not be exogenous to a transaction relationship and may partly develop within it (Ford, 1980).

The second dimension of trust pertains to attachments between transacting firms in the form of friendship or kinship bonds (Seabright, Levinthal, & Fichman, 1992), which we indicate as "habitualization."[3] This form of trust is related to the concept of social exchange indicated before. Social exchange is, by its nature, restricted to insiders: people with whom a focal individual shares bonds. Trust requires familiarity and mutal understanding and, hence, depends on time and context, on habit formation, and on the positive development of a relation. Repeated interactions lead to the forming of habits and the institutionalization of behavior (Berger & Luckmann, 1966). Consequently, patterns of behavior are shielded from rational decision making in the pursuit of efficiency. Case study research has borne out that in industrial buying relations, buyers display a strong tendency to persist in the use of existing suppliers (Woodside & Möller, 1992). This kind of inertia has to be reckoned with in a theory of vertical interfirm relations.

As Hirschman (1984) indicated, trust, unlike most economic commodities, can grow rather than wear out through use. Thus, habitualization becomes part of the "invisible assets" (Itami & Roehl, 1987) that make future cooperation easier to implement. If trust is associated with a subjective probability that a partner will cooperate, then optimism, positive experience, and naivety decrease that subjective probability, and trust therefore varies among agents, even under similar circumstances. A zero probability, or blind distrust, prevents an agent from cooperation and thus prevents the opportunity to build trust based on successful cooperation, so zero trust remains zero (cf. Gambetta, 1988). But if, on the basis of a nonzero subjective probability of cooperation by a partner, an individual enters cooperation, experience will lead to adjustment of the probability. If subjective probability is adapted to experience in a Bayesian process, it increases with positive experience. However, negative experience is likely to have a greater impact: when trust is betrayed, it may take a long time to build up again. If trust is blind, in the form of a unit subjective probability, it is likely to cause disappointment sooner or later because few partners will be able to resist every opportunity for defection. But positive experiences with a relationship plus an expansion of its scope will enhance a favorable perception of the probability of cooperation. Thus, the fourth and final proposition guiding our research was that

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[3] Presumably, trust based on such bonds would be close to Williamson's (1993) notion of personal trust, which he reserved for nontransactional relations with friends, family, and other loved ones. We do not accept such radical separation between impersonal business relations and personal relations.

a second dimension of trust is habitualization, defined as familiarization, habit formation, and bonding generated or confirmed by positive experiences.

Our two dimensions of trust, institutionalization and habitualization, correspond to two of the three "factors of perceived trustworthiness" proposed by Mayer, Davis, and Schoorman (1995) on the basis of an overview of the trust literature. Benevolence, in Mayer and colleagues' analysis, is "the extent to which a trustee is believed to want to do good to the trustor, aside from an egocentric profit motive" (1995: 718). This corresponds roughly to our dimension of habitualization. Integrity is "the trustor's perception that the trustee adheres to a set of principles that the trustor finds acceptable" (Mayer et al., 1995: 719). This aspect, based on, among other things, Sitkin and Roth's (1993: 368) concept of value congruence, clearly parallels our dimension of institutionalization. The third aspect distinguished by Mayer and colleagues is ability, akin to the concept of competence trust discussed above.

We noted that the two dimensions of trust are closely related in the notion of embeddedness (Granovetter, 1985): social relations often jointly develop norms or institutions and bonds of friendship or empathy. Thus, it may not be possible to separate the two dimensions in empirical work.

TRUST AND GOVERNANCE

We proposed that trust, in the narrow sense defined here, is a significant source of cooperation, along with coercion and self-interest. It yields a significant addition to governance as conceived by Williamson (1985, 1993), who looked only at contractual coercion (legal ordering) and self-interested incentives (private ordering). To embed non–self-interested trust in a wider scheme of governance, we proceeded as follows (cf. Nooteboom, 1996): X is willing to engage in cooperation with Y (either begin or continue cooperation), even if this makes X dependent, if X has a more or less well-grounded belief in the form of a subjective probability that Y will cooperate in the sense of not misusing such dependence. This belief may be based on the perceived available opportunities for misuse on the part of Y, Y's incentives for misuse, and Y's propensity to employ the opportunities. Propensity to use opportunities for defection in particular is related to trust, which has its basis in ethics, kinship, friendship, or empathy.

Our definition of *intentional trust* is now as follows: X trusts Y to the extent that X chooses to cooperate with Y on the basis of a subjective probability that Y will choose not to employ opportunities for defection that X considers damaging, even if it is in the interest of Y to do so. According to this definition, trust goes beyond forbearance, which Buckley and Casson (1988), defined as honoring both formal and informal obligations. Trust goes beyond obligations based on agreements and also applies to unforeseen contingencies.

The analysis is elaborated into the following scheme for the risk of

opportunism for the focal agent, labeled "ego," in relation with his or her partner, labeled "alter," (Nooteboom, 1996). We employ these terms in the remainder of this report because the scheme applies equally to both sides and is claimed to apply not only to the buyer-seller relations we studied, but also to interfirm relations and alliances in general. With the terms ego and alter, we also stress that we are not dealing with objective, impersonal forces and that each partner has his or her own perspective and more or less subjective perceptions, in line with the managerial choice perspective (Chiles & McMakin, 1996) that we adopted from the start.

Figure 2 depicts the perceptions of ego: how the size and probability of the loss he or she perceives depends on the partner's (alter's) perceived opportunities, propensity, and incentives for opportunism. A similar scheme applies to that partner.

The risk of opportunism has two dimensions: the probability that alter will behave opportunistically, and the loss ego incurs if he or she does. In an earlier study (Berger, Noorderhaven, & Nooteboom, 1995), we investigated the determinants of only one side of risk: the size of a possible loss. Here we wanted to investigate the explanation of both sides of risk simultaneously.

Relational risk has several causes. In the top half of the scheme we find the determinants of incentives for opportunism. Alter is tempted toward opportunism to the extent that ego is captive because of the value of alter relative to alternatives and ego's switching costs. It should be noted that in

FIGURE 2
Determinants of Risk of Opportunism:
Perceptions of Ego
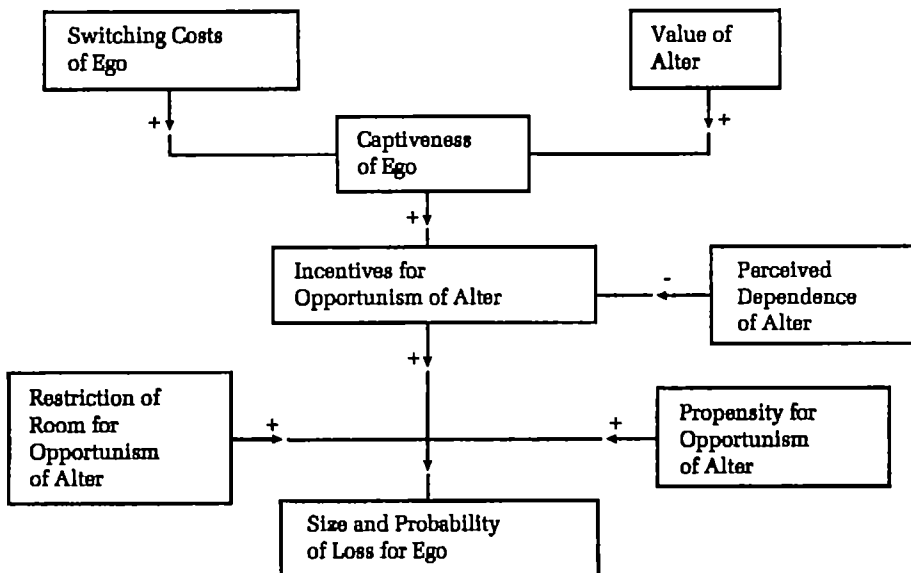
addition to switching costs (which may be due to dedicated investments), we recognize the value of the partner, which constitutes the reason for embarking upon the relationship. In this view, transaction costs can arise if there are no dedicated assets or other sources of switching costs (Walker & Weber, 1987).[4] We note also that alliances are entertained not only to minimize total production and transaction costs, as transaction cost economics suggests, but also for reasons of strategy—access to resources, market entry, preemption of competition—and exchanges of competencies (Contractor & Lorange, 1988; Kogut, 1988). Value is specified in relative terms, as excess over the next best alternative partner. Value is higher to the extent that the partner has a unique, valuable offering, and it is at its highest when the partner has a monopoly. Thus, value also depends on market structure (Kogut, 1988). Together, the value of the partner and switching costs determine captiveness, or dependence, which provides the partner with an incentive to defect by taking advantage of it. But this advantage works only to the extent that dependence is asymmetric. Alter's incentive toward opportunism is reduced to the extent that he or she is dependent upon ego, given his or her participation in ownership of specific assets, or because of the future rewards of cooperation.

However, such a threat of defection does not always exist. If a partner only obtains benefit from actual contribution, there is no problem. For example, if in joint research alter can benefit from ego's knowledge only if alter has developed the capacity to absorb the knowledge by contributing to the research (Grandori, 1995), then opportunism is self-defeating.

Figure 2 indicates that there are several ways to restrain opportunism, if a partner has incentives toward it. One way is direct supervision and authority, bringing the relationship under unified control through a merger/acquisition or a joint venture (hierarchy, in transaction cost economics). The second is control by means of contract, the legal and private ordering of transaction cost economics. In Figure 2 we add trust, as discussed, in the (perceived) propensity of an agent to exploit room for opportunism.

Figure 2 suggests many instruments for controlling relational risk: (1) Ego can reduce its stake in specific assets, and thereby reduce switching costs, yielding less captiveness and a smaller potential loss (in case the relationship breaks or the partner takes opportunistic action). (2) Ego can diversify so that the value of one partner relative to the next best one is reduced, thus reducing captiveness and potential loss. (3) Ego can limit room for alter's opportunism through contracts and monitoring. (4) Ego can reduce the partner's opportunities (or incentives) for opportunism by taking hostages. (5) Ego can reduce the partner's opportunities for opportunism by takeover or by instituting a joint venture (the latter might also be interpreted

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[4] However, the value of a partner as can be viewed a switching cost, as value ego stands to lose when the relationship is discontinued.

as taking a hostage). (6) Ego can reduce the partner's incentives for opportunism by building an attractive future potential for cooperation. (7) Ego can reduce alter's incentives for opportunism by threatening to damage alter's reputation. (8) Ego can reduce alter's incentives for opportunism by increasing alter's stake in specific assets, thereby increasing his or her switching costs and potential loss. (9) Ego can reduce alter's incentives for opportunism by increasing the uniqueness of ego's value for alter. (10) Ego can reduce alter's propensity toward opportunism by building trust through personal bonds and shared norms and values. (11) Ego can select only partners with whom ego shares many norms and values.

Each of these instruments has its cost or problems. Generally, in transaction cost economics expectations concerning self-interest are expected to be less binding than authority (Dow, 1987; Walker & Poppo, 1991). But unified control in a merger/acquisition carries the price of fewer high-powered incentives and flexibility and the risks that different cultures will not be effectively integrated. A joint venture carries set-up costs and also risks of integration failure. Strict contractual control may set off a vicious cycle of suspicion and retaliation via restrictions, which may stifle a relationship. It also reduces flexibility, which may work against joint development since at the outset of a relationship firms cannot define expectations or demands exactly. Monitoring may be technically infeasible, and it matters whether a partner can observe performance (output) or only effort (input; Alchian & Demsetz, 1972; Fama & Jensen, 1983). Reduced commitment in specific assets may destroy the objective of developing complementary competencies for joint development. In some technologies, however, specialized products can be made with general purpose assets, so that the need for specific assets is limited (Nooteboom, 1993a). Diversification of partners, to limit the uniqueness of any of them, multiplies costs and may provide a disincentive for all partners to do their best. The availability of partners depends on market structure. The basis for trust may be absent in novel alliances between partners without any common cultural background. Thus, the optimal governance package depends on a number of contingencies: the objectives of an alliance, the structure of payoffs, market structure, and technical and cultural conditions.

Trust can only be considered an instrument of governance in a limited sense: it contributes to risk reduction, but it cannot be instituted instantaneously. If trust is not already present, it has to be built by developing bonds or shared norms and values. It can be more an outcome than a precondition of a relation, in which case it provides an improved basis for ongoing cooperation. Shared norms and values should, however, be a criterion for the selection of partners and in that sense can serve as an instrument.

The contingency of many possible configurations of governance under different conditions has implications for the conclusions of any empirical study, including our own. Finding no hypothesized effect of some purported instrument of governance does not prove that the instrument is irrelevant in

general. Lack of significance may just mean that it does not fit the contingencies of the case at hand. On the other hand, finding an effect proves that an instrument is relevant, even if in other cases relevance is not apparent.

HYPOTHESES

For our present purpose, we used the scheme in Figure 2 to derive hypotheses for empirical testing. We note that our focus was differences in the size and the probability of the potential loss perceived by transaction partners. This focus is not customary in transaction cost economics or in previous studies of alliances. Some of the factors that we expected to be important have been included in previous empirical work, but our hypotheses concerning the size and probability of risk are novel and cannot be directly derived from previous empirical work. The hypotheses are logically derived from the analytical framework described above.

The first two hypotheses concern what the focal partner (X) stands to lose if the relationship with Y breaks. In line with the logic of transaction cost economics, this potential loss constitutes the maximum for which X can be "held up" and thereby defines the maximum size of the loss that X can incur. This loss thus affects the size rather than the probability of loss: it is not the size of perceived potential loss that may induce the partner to engage in opportunistic conduct, but the measures of governance that we will consider later. Logically, then, this maximum size of loss for X is equal to the total value of Y relative to that of the next-best option, plus the switching costs that X would incur in switching to the next-best alternative. The core of transaction cost economics is that switching costs for X are constituted by assets that are owned or guaranteed by X and are specific to the relationship—that is, they would need to be incurred again in a similar relation with another partner.[5] Thus,

> *Hypothesis 1. The value that a partner offers relative to the next-best alternative has a positive effect on the size of possible loss rather than an effect on its perceived probability.*

> *Hypothesis 2. The costs of switching to an alternative partner, measured by means of asset specificity, have a positive effect on the size of possible loss rather than an effect on its perceived probability.*

Now we turn to instruments of governance and contingencies, which affect the opportunities for alter to defect—to break a relation or threaten to do so, and thereby affect the probability—rather than the size—of loss. First of all, traditionally, the threat of sanctions, in legal or private ordering, plus the monitoring required to impose them, has been seen as the main instru-

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[5] We note that switching costs may be more than assets owned or vouched for: they may include loss of hostages or reputation.

ment for imposing compliance with the terms of an agreement. In legal ordering this imposition occurs by means of contracts that can be enforced in a court of law, such as the detailed contracts negotiated in the relationship between electric utilities and coal mines (Joskow, 1985). In private ordering it can take the form of posting hostages, reputation mechanisms, and other restraints. We reconstruct these forms of ordering in terms of restricting opportunism.

> *Hypothesis 3a. Legal ordering, taken as a restriction of room for a partner's opportunism, has a negative effect on the perceived probability of loss rather than an effect on its size.*

> *Hypothesis 3b. Private ordering, taken as a restriction of room for a partner's opportunism, has a negative effect on the perceived probability of loss rather than an effect on its size.*

Next, we turn to trust, which constitutes the core of the present article, with its two dimensions of institutionalization and habitualization. We propose that trust yields an additional basis for restraining opportunism and that it operates by limiting the inclination of alter to employ available room for opportunism (Figure 2). Thereby it reduces the probability of loss (rather than its size) and enables partners to go foward, even though not all contingencies arising in the relationship are known (Andaleeb, 1992). In a previous study, we found a negative effect of trust on perceived dependence (Berger et al., 1995), but here, with a different data set, we wanted to be more precise, and we hypothesized trust to negatively affect the perceived probability of loss, not the size of loss.

> *Hypothesis 4a. Institutionalization (partners' shared norms and values) has a negative effect on the perceived probability of loss rather than an effect on its size.*

> *Hypothesis 4b. Habitualization (partners' having established habits, bonds, good communication, and empathy) has a negative effect on the perceived probability of loss rather than an effect on its size.*

Next, we allow for an effect of self-confidence: an agent who is confident of her or his own value will be more trusting than one who is diffident (cf. Deutsch, 1973): the agent will perceive a smaller probability of loss. An effect of own value can also be interpreted differently. According to Figure 2, alter has less incentive toward opportunism to the extent that he or she depends on ego, since ego might retaliate with opportunism. If ego is confident about her or his value to alter, ego may rationally expect alter to have little incentive toward opportunism, and ego will therefore perceive a lower probability of loss.

> *Hypothesis 5. The value one partner offers another (relative to the partner's next best alternative) has a negative*

effect on the perceived probability of loss rather than an effect on its size.

The literature on repeated games (Axelrod, 1984) demonstrates how the expectation of future cooperation reduces the incentive for opportunistic behavior: short-term benefits from defection may be less than long-term gains from ongoing cooperation. Long-term business relations have been shown to lead to closer cooperation and more collaboration (Lane & Bachmann, 1996). Heide and Miner (1992) found a positive relationship between expected continuity and cooperation but did not look at perceived dependence and the associated risk. We propose that in long-term relationships there is more at stake, yielding a positive effect on size of loss. But long-term relations also offer more possibilities of establishing personal ties and of growing trust as an invisible asset, so the' perceived probability of loss is lower.

> *Hypothesis 6a. The past growth of a relationship has a positive effect on the size of loss and a negative effect on the perceived probability of loss.*

> *Hypothesis 6b. A long-term perspective has a positive effect on the size of loss and a negative effect on the perceived probability of loss.*

Hypotheses 5, 6a, and 6b do not pertain to trust, as narrowly defined before, in that the variables posited to affect loss are egotistic sources of cooperation: they pertain to the rational evaluation of self-interest. They do not affect inclination toward opportunism, but do affect incentives inspired by self-interest. According to Emerson's (1962) theory of dependence as well, ego's dependence on alter can be balanced by alter's dependence on ego. To the extent that ego knows alter to be dependent on him- or herself, ego will perceive loss associated with his own dependence on alter to be less probable. This is one interpretation of the effect of ego's own value for alter, (Hypothesis 5), and we can proceed further along this line: ego may have other knowledge of alter's dependence that may constrain alter's perceived incentives for opportunism, as illustrated in Figure 2. Thus,

> *Hypothesis 7. Other factors that promote a partner's dependence, and thereby reduce his or her incentives for opportunistic behavior, have a negative effect on the perceived probability of loss rather than an effect on its size.*

CONTROLS

From the perspective of managerial choice (Chiles & McMakin, 1996), and in view of the structure of our data (ten customer relationships for each of ten suppliers), we expected firm-specific effects. To what extent are perceptions of relational risk determined by characteristics of the perceiver rather than by the objective conditions of a transaction relationship? Our em-

pirical work was designed as an experiment to investigate such effects, along with systematic effects of the configuration of governance.

First of all, some people (and some firms) are more sensitive to risks (exhibit higher uncertainty avoidance) than others. Uncertainty avoidance, originally conceptualized as a dimension of national culture by Hofstede (1980), was later shown to also be associated with organization-level variables (Hofstede, Nuijen, Ohayv, & Sanders, 1990). We expected that, ceteris paribus, firms with higher uncertainty avoidance would perceive higher risks; in particular, higher probability of loss. Thus,

> *Hypothesis 8. High uncertainty avoidance on the part of a focal agent has a positive effect on the perceived probability of loss rather than an effect on the size of loss.*

A large firm is likely to be subject to lower transaction costs and relational risk than a small firm, as a result of its high capacities for search, contract design, monitoring, and litigation, strong specialized staff functions, and wide range of products, markets, and transaction relations, which yield opportunities for alternative employment of partially specific assets, lower switching costs, and a greater spread of risk (Nooteboom, 1993b). Consequently, a large firm is likely to incur lower risk.

> *Hypothesis 9. The size of the firm of a focal agent has a negative effect on the size of loss rather than an effect on its perceived probability.*

However, as we could not be sure that firm characteristics such as uncertainty avoidance and size would account for all firm-specific effects, we added dummy variables for firms to test for remaining effects.

DATA AND MEASUREMENT

A major question was how trust was to be measured. We used factor analysis to construct measures from multiple questionnaire items relating to the different dimensions of trust contained in a survey of buyer-seller relations.

One assumption guiding our analysis was that opportunism and trust are to some extent idiosyncratic: they vary between people and organizations even if other conditions are identical. As a result, trust, governance choices, and their effects on perceived risk will vary between people. We wanted to include this assumption in our study and therefore asked each of ten suppliers in the same industry about ten customer relationships. We could thus test for systematic effects of trust, governance, and so forth, as opposed to firm-specific effects.

The study focused on the microelectronics assembly industry in the Netherlands, which produces components for such things as telecommunications equipment and process control devices, often in small series and according to the specifications of buying firms. Suppliers were approached through the employer's association for the electronics and metal industry in

the Netherlands. Ten suppliers agreed to cooperate. In the beginning of 1994, a member of the research team visited these firms. These visits took an average of three-and-one-half hours. During the visit, the researcher collected data pertaining to relationships with ten of the firm's most important customers. The questionnaire was based on one we had developed and tested in a previous study (Berger et al., 1995) of 80 suppliers of a single manufacturer of photocopying machines. For the current study, we omitted items that had proved to be of little value and added some new items. Either the general manager or the sale manager of a firm completed the questionnaire, with the researcher clarifying questions when necessary. This procedure minimized the risk of respondents' misunderstanding the questions and also guaranteed that there were no nonresponses, and hence, no missing data. To maintain comparability between relationships, we designed the questionnaires to be completed horizontally: a respondent answered a question for all 10 relationships before moving on to the next question. In this way, data were obtained with regard to 97 relationships.

Apart from variables that by their nature are binary (yes/no) or cardinal (e.g., firm sales) all items on the questionnaire had five-point response scales. We chose the items on the basis of their hypothesized relation to latent variables that resulted from the theoretical analysis. Most variables were represented by multiple underlying items, but some had only a single item. We used confirmatory factor analysis to test the measurement hypotheses and Cronbach's alpha to determine overall construct reliability, setting the cut-off point at the usual value of .70. Factor loadings were used to determine whether each item contributed significantly to the joint factor, with the cut-off point at the usual value of 0.3. When an item had a lower loading, it was dropped, and the analysis was repeated for the remaining items until a reliable scale with reliable loadings emerged. We then added the items to yield a measure of the latent variable. The Appendix gives the resulting scales with their alpha values and specification of the underlying items. As shown, all multi-item scales had alphas above .70, except growth of business between the partners ($\alpha = .68$).

The size of ego's potential loss was measured on a two-item scale, and the probability of loss on only a one-item scale. For the relative value that a partner offered, we had two measures: the partner's share of the total sales of ego, and a scale of four other items, the remaining indicators of the value of alter. As joining these measures into one scale of partner value greatly reduced the alpha coefficient, we used both measures. Ego's asset specificity was the aggregate of four variables, one for each dimension of asset specificity specified by Williamson, with a total of ten items. Restriction of room for alter's opportunism was the aggregate of two scales, one for legal ordering and one for private ordering, with a total of seven items. Trust was the aggregate of two dimensions, habitualization and institutionalization, with a total of six items. The relative value offered by ego to alter was an aggregate of six items. Continuity of the relationship was an aggregate of two scales, past growth of the relationship and future perspective, with a total of five

items. Limitation of alter's inclination toward opportunism, or restraint of alter, was composed of five items, and uncertainty avoidance of ego had seven items. Firm size of ego was naturally a cardinal measure.

First, we tested the idea that the size of ego's potential loss and the probability of such loss constituted separate dimensions. In factor-analytic terms, we asked if the dimensions were orthogonal. To determine this, we compared the results of a factor analysis of the two items underlying size of loss with results on the three items of size of loss and probability of loss taken together. Table 1 reports the results.

The table shows that Cronbach's alpha, which was quite high for the size of loss, deteriorated drastically when the single item for probability of loss was added (from $\alpha = .90$ to $\alpha = .26$). A factor is then formed, with high loadings from the items of size of loss (.95, .86), but a low loading (.34) from the probability item, with a correspondingly low communality (.12) of that item with the factor. The loading is only just above the cut-off point of .3. This is sufficient evidence to conclude that our measurements of size and probability of loss indeed represent separate dimensions, warranting separate regression equations to explain each.

To test the hypotheses explaining size of loss and probability of loss, we regressed these variables on the explanatory variables pertaining to the main categories of causation: the captiveness of ego (alter's relative value, based on its share of sales and the rest of its value, and on switching costs resulting from ego's dedicated and specific assets); governance (restriction of room for alter's opportunism through legal ordering and private ordering); alter's incentives (the value ego offers alter, the continuity of the relationship, and the restraint of alter); trust (habitualization and institutionalization); and the control variables (ego's uncertainty avoidance and ego's size).

In a second set of analyses, we split up the explanatory variables into their components. We used a backward procedure, including all the explanatory variables initially and then eliminating variables with nonsignificant effects (effects at a lower than 90 percent confidence level. Table 2 gives results, indicating which hypotheses were confirmed and which were not. Most of the hypotheses were confirmed. We present a systematic discussion later in the article, showing that in some cases lack of confirmation yields interesting interpretations.

TABLE 1
Orthogonality of Size of Loss and Probability of Loss[a]

Construct	α	Items	Factor Loading	Communality
Size of loss	.90	Size	0.94	0.88
		Size	0.86	0.74
Size + probability of loss	.26	Size	0.95	0.90
		Size	0.86	0.73
		Probability	−0.34	0.12

[a] $N = 97$.

TABLE 2
Results of Regression Analysis[a]

Hypothesis and Variable	Hypothesis Confirmed?	Size of Loss	Hypothesis Confirmed?	Probability of Loss
H1: Value of alter				
Alter's share of sales	Yes	0.59 (0.0)**	Yes	0.02 (0.79)
Remaining indicators of alter's value	No	0.07 (0.45)	Yes	−0.05 (0.60)
H2: Asset specificity	No	0.10 (0.31)	Yes	0.11 (0.21)
H3: Restriction of room for alter's opportunism	Yes	0.10 (0.20)	Yes	−0.34 (0.0)**
H4a, H4b: Trust	Yes	−0.06 (0.43)	Yes	−0.22 (0.03)*
H5: Value of ego for alter	Yes	−0.03 (0.72)	No	−0.05 (0.58)
H6: Continuity	Yes	0.28 (0.0)**	Yes	−0.25 (0.02)*
H7: Restraint of alter	No	0.17 (0.02)*	No	0.01 (0.91)
H8: Uncertainty avoidance	Yes	0.07 (0.33)	No	−0.20 (0.02)*
H9: Firm size	No	0.07 (0.39)	Yes	0.08 (0.43)
R^2		0.54		0.35
Adjusted R^2		0.52		0.32

[a] $N = 97$. Standardized coefficients are shown, with significance levels in parentheses. In the final step of the backward procedure, only those variables are retained that have a significant effect ($p < .05$); the values and significance levels of other variables derive from earlier steps.
   * $p < .05$
   ** $p < .01$

The most striking lack of confirmation concerns the effect of the restraint of alter, a measure of limits on incentives for opportunism. We had expected a zero effect on the size of ego's loss and a negative effect on the probability of loss, but we found a zero effect on probability and a positive effect on size. However, inspection of the correlation matrix, found in Table 3, shows that restraint of alter has a strong positive correlation with ego's asset specificity, which, according to Hypothesis 2, has the effect we found for restraint of alter. This suggests that restraint of alter's opportunism may be taking the place of ego's switching costs (asset specificity).

The correlation between asset specificity and restraint of alter has an important implication: theoretically, according to Hypothesis 1, asset speci-

TABLE 3
Correlations[a]

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Size of loss														
2. Probability of loss	-.32**													
3. Trust	.14	-.30**												
4. Habitualization	.17	-.38***	.84***											
5. Institutionalization	.02	-.08	.73***	.31**										
6. Restriction of room for alter's opportunism	.30**	-.41***	-.00	.04	.04									
7. Continuity	.40***	-.47***	.48***	.45***	.29**	.33***								
8. Asset specificity	.45***	-.05	.02	.04	.08	.17	.17							
9. Value of alter	.33***	-.33***	.12	-.01	.28**	.37***	.37***	.56***						
10. Alter's share of sales	.64***	-.06	.01	.02	.08	.22	.13	.43***	.15					
11. Remaining indicators of value of alter	.27**	-.29**	.14	-.04	-.31**	.31**	.32**	.56***	1.0***	.12				
12. Value of ego	.28**	-.32**	.25	.14	.28**	.32**	.39***	.43***	.85***	.15	.87***			
13. Uncertainty avoidance	.02	-.14	-.18	-.07	-.29**	-.08	-.01	.21	.25	-.12	.24	.11		
14. Size	.11	-.21	-.04	.03	-.04	.52***	.39***	.02	.24	-.04	.19	.18	-.08	
15. Restraint of alter	.27**	-.13	.25	.14	.20	.00	.24	.54***	.55***	.05	.59***	.58***	.13	-.19

[a] $N = 97$.

** $p < .01$

*** $p < .001$

ficity increases the stake that ego has in a relationship and therefore increases the size of a loss, but it also contributes to the dependence of the partner: by making more specific investments ego offers a unique value to alter, which contributes to alter's dependence and thereby reduces his or her inclination toward opportunism, which reduces the probability of loss.

We thus computed the regressions again excluding the restraint of alter's opportunism from the equation for size of ego's loss; results are summarized in Table 4.

The results for ego's perceived probability of loss are almost exactly like those shown in Table 2. For the size of ego's loss, asset specificity now has a significant effect: its coefficient hardly changes but is now highly significant. Another result is that the coefficient of continuity increases and maintains its high level of significance. This finding is consistent with the idea

TABLE 4
Results of Regression Analysis with Restraint of Alter Excluded

Hypothesis and Variable	Hypothesis Confirmed?	Size of Loss	Hypothesis Confirmed?	Probability of Loss
H1: Value of alter				
Alter's share of sales	Yes	0.52 (0.0)**	Yes	0.02 (0.78)
Remaining indicators of alter's value	No	0.07 (0.42)	Yes	−0.05 (0.60)
H2: Asset specificity	Yes	0.17 (0.03)*	Yes	0.11 (0.21)
H3: Restriction of room for alter's opportunism	Yes	0.07 (0.36)	Yes	−0.34 (0.0)**
H4a, H4b: Trust	Yes	−0.03 (0.75)	Yes	−0.22 (0.03)*
H5: Value of ego for alter	Yes	0.01 (0.87)	No	−0.05 (0.58)
H6: Continuity	Yes	0.31 (0.0)**	Yes	−0.25 (0.02)*
H7: Restraint of alter		Excluded		Excluded
H8: Uncertainty avoidance	Yes	0.05 (0.48)	No	−0.20 (0.02)*
H9: Firm size	No	0.01 (0.94)	Yes	0.08 (0.43)
R^2		0.53		0.35
Adjusted R^2		0.52		0.32

^{a} $N = 97$. Standardized coefficients are shown, with significance levels in parentheses.
* $p < .05$
** $p < .01$

that the earlier lack of significance was due to the correlation between asset specificity and restraint of alter.

To test Hypotheses 3a and 3b, 4a and 4b, and 6a and 6b, we investigated how the effects were distributed over the component variables, evaluating the different aspects of asset specificity, ordering, continuity, and trust. But with the enlarged number of explanatory variables, we encountered strong multicollinearity. However, we persisted, especially regarding the trust-related variables (habitualization and institutionalization), which form the main focus of the present study. We thus tested their separate effects on the probability of loss in a reduced model with as many variables as possible left out to reduce the problem of multicollinearity. We omitted the variables that previously (Table 4) were found to be insignificant: those pertaining to the value of the partners to each other, asset specificity, and ego's firm size. Table 5 gives results. Habitualization had the expected effect, but institutionalization did not. We noted from the beginning that the two dimensions of trust were expected, on theoretical grounds, to be difficult to separate; empirically, this difficulty is reflected in their mutual correlation ($r = .31$, $p < .002$, Table 3). Furthermore, it should be noted that the overall trust variable includes one item more than the total of its components (see the Appendix). This item was kept separate from habitualization and institutionalization because it could with equal justification be added to either of them (in both cases, Cronbach's alpha increases by more than 10 percentage points). This fact also reflects the connectedness of the two dimensions of trust. We therefore retained the result with the overall variable (Table 4), but we cannot rule out the interpretation that habitualization has a significant effect and institutionalization does not.

Next, we tested for any remaining firm effects. Our hypothesis was that firm effects are taken care of by the firm-related variables uncertainty avoidance and firm size. To test this prediction, we repeated the regression analyses with dummies for the ten firms whose customer relations we were studying. To reduce the chance of multicollinearity, we again allowed only for the variables that had previously been found to be significant (Table 4). In other words, the object was to test whether, in comparison with the last results, the addition of firm dummies (1) yielded a significant increase in R^2 and (2) did not disturb the results on the explanatory variables (Table 4). Table 6 gives results.

Table 6 shows that dummy variables do yield significant effects and that they significantly raise R^2. We therefore rejected our hypothesis that the two firm-specific explanatory variables sufficed to account for firm effects. The number of significant dummies is greater for the size of loss than for the probability of loss. For probability, one of the firm-specific variables, uncertainty avoidance, had a significant effect; thus, it accounts for at least part of firm variation. For size of loss, neither firm variable was significant. However, addition of the dummies did not affect the results concerning the systematic (not firm-specific) effects shown in Table 4. On the contrary, the size and significance of those effects increased, with the exception of the

TABLE 5
Results of Regression Analysis with Habitualization and Institutionalization Separated

Hypothesis and Variable	Hypothesis Confirmed?	Probability of Loss
H1: Value of alter		Excluded
H2: Asset specificity		Excluded
H3: Restriction of room for alter's opportunism	Yes	−0.34 (0.0)**
H4a: Trust 1: Habitualization	Yes	−0.22 (0.03)*
H4b: Trust 2: Institutionalization	No	0.05 (0.62)
H5: Value of ego for alter		Excluded
H6: Continuity	Yes	−0.23 (0.02)*
H7: Restraint of alter		Excluded
H8: Uncertainty avoidance	No	−0.22 (0.03)*
H9: Firm size		Excluded
R^2		0.37
Adjusted R^2		0.35

[a] $N = 97$. Standardized coefficients are shown, with significance levels in parentheses.
* $p < .05$
** $p < .01$

effect of uncertainty avoidance on the probability of loss (which did, how-ever, remain significant). Thus, the omission of the remaining firm effects, which are considerable, did not bias the results on the systematic effects.

Lastly, we further tested the stability of the results by employing step-wise regression as an alternative to backward regression. The former yielded virtually the same results as the latter. The only difference worth mentioning was that fewer firm dummies were included in the end result with the stepwise procedure. In the regression equation of the probability of loss, we omitted the dummy for firm 1; in the regression of size of loss, we omitted the dummies for firms 2 and 4. For the rest, the patterns of significant and nonsignificant variables were identical, and differences in regression coefficients and their significance levels were small.

DISCUSSION

The study confirms the idea that relational risk has two dimensions: size of loss and probability of loss, each of which has substantially different causes. In particular, the central hypothesis (Hypothesis 4) was confirmed:

TABLE 6
Results of Regression Analysis with Dummy Variables for Firms

Hypothesis and Variable	Hypothesis Confirmed?	Size of Loss	Hypothesis Confirmed?	Probability of Loss
H1: Value of alter				
Alter's share of sales	Yes	0.53 (0.0)**		Excluded
Remaining indicator's of alter's value		Excluded		Excluded
H2: Switching costs	Yes	0.26 (0.01)**		Excluded
H3: Restriction of room for alter's opportunism		Excluded	Yes	−0.35 (0.0)**
H4a, H4b: Trust		Excluded	Yes	−0.26 (0.02)*
H5: Value of ego for alter		Excluded		Excluded
H6: Continuity	Yes	0.32 (0.0)**	Yes	−0.30 (0.01)*
H7: Restraint of alter		Excluded		Excluded
H8: Uncertainty avoidance		Excluded	No	−0.16 (0.09)*
H9: Firm size		Excluded		Excluded
Firm dummies		D2 −0.15 (0.09)†		D1 −0.12 (0.11)
		D4 −0.13 (0.05)†		D2 0.32 (0.0)**
		D5 −0.18 (0.01)**		D6 0.35 (0.0)**
		D6 −0.19 (0.01)**		
		D10 −0.28 (0.0)**		
R^2		0.64		0.58
Adjusted R^2		0.61		0.55

a $N = 97$. Standardized coefficients are shown, with significance levels in parentheses.
† $p < .10$
* $p < .05$
** $p < .01$

trust, induced by institutionalization and habitualization, has a negative effect on risk in the form of the perceived probability of loss. If the two components are separated, only habitualization has a significant effect; however, the two dimensions are difficult to separate and are perhaps best kept together. Perceived probability of loss is further reduced, according to Hypotheses 3a and 3b, by governance in the form of restriction of room for opportunism by means of legal and private ordering. As hypothesized (Hy-

pothesis 6b), it is also reduced when there is perceived continuity in a relationship based on past growth and future perspective. These results can be seen as a confirmation of our thesis that both trust and traditional factors from transaction cost economics are relevant and that an extended theory of transactions applies to relational risk.

Contrary to Hypotheses 5 and 7, restraints on a partner's incentives for opportunism, in the form of the value that ego offers and other indicators of alter's dependence, do not affect the perceived probability of loss. This finding need not, of course, imply that these variables should not affect that perception. Perhaps the suppliers interviewed in the study were not sufficiently sophisticated to include this indirect evaluation of the dependence of their partners as a condition that reduced their own risk. This analysis yields a policy implication: in assessing relational risk, one partner should not only consider direct effects concerning his or her own dependence, but also indirect effects of the other partner's dependence via restraint on opportunism. But note that we also found a significant correlation between asset specificity and restraint of alter's opportunism. This finding is important, because thereby the *net* effect of specific investments can become ambiguous: asset specificity creates vulnerability in terms of the potential size of loss, but it can yield protection in the form of a reduced probability of loss.

We also found that ego's uncertainty avoidance had a *negative* effect on the perceived probability of loss, instead of the positive effect hypothesized (Hypothesis 8). This contrary effect has a clear interpretation: rather than taking a gloomy look at the perceived risk that remains after taking governance measures, as we hypothesized, risk-averse firms tend, more than others, to consider risk sufficiently covered.

Risk in the form of the size of loss experienced if a relationship goes wrong was, as hypothesized, positively affected by the value of the partner assessed in terms of the percentage of a focal agent's sales associated with that partner, but remaining aspects of partner value had no significant effect. Thus, Hypothesis 1 is partly confirmed. Switching costs resulting from dedicated and transaction-specific investments (asset specificity) also had the hypothesized positive effect on size of loss (Hypothesis 2), but only after we disallowed for an effect of restraint of alter, which is strongly correlated with asset specificity. Continuity of a relationship had its hypothesized positive effect on the size of loss (Hypothesis 6a). Firm size did not have the hypothesized negative effect (Hypothesis 9). We do not consider this a final verdict. As is often the case, firm size is correlated with many other variables, so its effect may be masked.

Our check on firm-specific effects through dummy variables showed that such effects are important but that variables such as uncertainty avoidance and size do not suffice to cover all firm effects. However, the omission of firm dummies did not, in the present study, yield a bias in the measurement of the systematic effects derived from our extended theory of transactions.

As discussed, different contingencies are likely to lead to different con-

figurations of governance, so we cannot conclude that the present results apply in all cases. The results do show that certain elements of governance and trust have the expected effects, at least in this case, and in that sense, theory is confirmed. Moreover, we should recall that the study focused on intentional trust, not competence trust.

The present study confirms our earlier finding of a negative effect of trust on perceived dependence (Berger et al., 1995), but here we added more detail, dividing trust into two dimensions (institutionalization and habitualization) and dividing the risk of dependence into the size and the probability of loss. Of course, these procedures do not eliminate the need to test the external validity of the effect of trust on other sets of data. Another indication for further research emerges from the result that the incorporation of uncertainty avoidance and firm size did not suffice to account for the firm-specific effects of perceived risk exhibited by firm dummy variables. Furthermore, the constructs that we used to measure the size and probability of loss could be expanded to include more items. An important area for further research is the development of further hypotheses concerning which configurations of governance are expected to be the best under different conditions for relationship objectives, payoff structure, market conditions (structure of supply and demand), technical conditions (need for specific assets, opportunities for monitoring), and cultural conditions (bonding, shared norms and values). Such hypotheses should be tested in various settings.

A policy recommendation that can be derived from the study is that firms may be well advised to employ more sophistication in their assessments of relational risk. In particular, firm's agents might take into account the restraint that they need and want to exercise in view of their firm's dependence, particularly dependence resulting from the value the firm is offering to its partner.

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APPENDIX
Measurements and Scales

Dependent Variables

Size of loss, ego ($\alpha = .90$)

>   Actually, we cannot afford a break with this customer.
>   If the relation with this customer breaks, it will take us much effort to fill the gap in turnover.

Probability of loss, ego

>   The risk in this relation is sufficiently covered by contractual and noncontractual means.

Explanatory Variables, Captiveness [Value of Alter)

Alter's share of sales: percentage of total sales to the buyer (alter) as a cardinal measure of the value of alter.

Remaining indicators of value of alter ($\alpha = .70$)

>   Because we supply to this customer we are able to build up technological know-how that is also useful for other customers.
>   Because we supply to this customer we obtain market knowledge that would otherwise be difficult to access.
>   Our firm is involved in an early stage in the development of new components for this customer ("early supplier involvement").
>   This customer involves us in the testing of components and/or in prototyping.

Dedicated assets ($\alpha = .83$)

>   Our firm employs significantly more people than if we did not supply this customer.
>   Our firm must have people with specific expertise in-house to be able to supply this customer.
>   Our firm has had to create extra capacity to supply this customer.
>   We had to make investments to satisfy the specific supply conditions of this customer (e.g. for "just-in-time").

Physical asset specificity ($\alpha = .70$)

>   For our production for this customer highly specific machines, apparatus, or instruments are needed.
>   Most of the machines, apparatus, or instruments needed for the production for this customer can also be used for other customers, if necessary.

Knowledge specificity ($\alpha = .68$)

>   We have had to invest much time in acquiring the procedures desired for this customer (e.g., in the area of logistics and quality control).
>   Much specific technological know-how is required to effectively supply this customer.
>   Much knowledge of the internal organization of this customer is required for effective cooperation.

Location specificity

>   The location of our firm plays an important role in the relation with this customer.

Switching costs, ego = asset specificity of ego ($\alpha = .84$) = dedicated assets + physical asset specificity + knowledge specificity + location specificity.

Explanatory Variables, Governance

Legal ordering ($\alpha = .79$)

>   The contract with this customer is as complete as possible.
>   The contract forms the core of our relation with this customer.
>   In this relation it is not so important to have a good contract.

Private ordering (α = .71)

   The customer shares in the payment for specific machines and apparatus that we must
   make for the production for him.

   The customer shares in the payment for the investments in specific tools and/or measure-
   ment apparatus that we must make for the production for him.

   Guarantees are given for minimal custom over an agreed period of time.

   We give guarantees for supply for an agreed period of time.

Restriction of room for alter's opportunism (α = .79) = legal ordering + private ordering.

Explanatory Variables, Incentive-Related

Value of ego (α = .76)

   Our supply performance to this customer cannot be assessed on its merit if one looks only
   at the price.

   This customer is aware that our supply performance cannot be assessed on its merit if one
   looks only at price.

   Our supply to this customer is clearly custom-made.

   We provide an important source of information on new technologies for this customer.

   Our firm is involved in an early stage in the development of new components for this
   customer ("early supplier involvement").

   This customer involves us in the testing of components and/or in prototyping.

Growth (α = .68)

   The relation between our firm and this customer has continually improved in the course of
   time.

   Our supply to this customer has increased strongly in the course of time.

Future perspective (α = .67)

   In this relation it is assumed that contracts will in general be renewed.

   For the foreseeable future we do not expect a break with this customer.

   We see the relation with this customer as a long-term relation, in which one must invest,
   and in which both sides are willing to make concessions if it is really needed.

Continuity (α = .78) = growth + future perspective.

Restraint of alter (α = .80)

   If this customer did not behave fairly with respect to us, he could seriously damage his
   reputation in the market.

   This customer is more dependent on us then we on him.

   This customer cannot afford a break with us.

   If the relation with our firm breaks, the customer will have trouble finding a comparable
   supplier.

   We know much more about the customer than he about us.

Explanatory Variables, Trust-Related

Habitualization (α = .75)

   Because we have been doing business so long with this customer, all kinds of procedures
   have become self-evident.

   Because we have been doing business for so long with this customer, we can understand
   each other well and quickly.

   In our contacts with this customer we have never had the feeling of being misled.

Institutionalization (α = .87)

   In this relation, both sides are expected not to make demands that can seriously damage the
   interests of the other.

   In this relation the strongest side is expected not to pursue its interest at all costs.

Habitualization and institutionalization (α = .77) = Habitualization + institutionalization + item:

   In this relation informal agreements have the same significance as formal contracts. (This
   item was kept separate from habitualization and institutionalization because it could
   with equal theoretical and empirical justification be added to either of them: in both cases
   Cronbach's alpha increased by 10 percentage points.)

Control Variables

Uncertainty avoidance, ego (α = .80):

> In our relations with customers, our firm always tries to cover everything watertight contractually.
> In the contact with customers we stick to the procedures and rules that apply in our firm.
> We want to prevent becoming too dependent on one or a few large customers.
> In our firm there is a clear preference for risky projects with an opportunity for high profits.
> In view of the nature of our industry it is best to proceed cautiously, and not take too large steps.
> With us, decisions are taken fast.
> With us, administrative procedures play an important role.

Size = ego's annual sales.

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THE IMPACT OF TECHNOLOGICAL COMPLEXITY AND INTERFIRM COOPERATION ON BUSINESS SURVIVAL

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This study's predictions are that businesses developing high-complexity technologies face higher risks of failure than other businesses because of greater competency demands and higher organization costs. Further, alliances moderate such failure risks but provide fewer survival benefits for businesses commercializing less complex technologies. Hypotheses were tested with longitudinal data from the U.S. hospital software industry. High-complexity technology was associated with higher risk of failure, and alliances only partially moderated such risk.

What impact does technological complexity have on business survival? And how effective is interfirm cooperation in overcoming the challenges of developing technologically complex products? Though the concept of technological complexity has been extensively employed in strategy and technology studies (Demchak, 1992; Perrow, 1984, 1994; Roberts, 1990; Roberts & Gargano, 1990; Tushman & Rosenkopf, 1992), it has not been adequately defined and developed, so few empirical studies have employed rigorous measures of technological complexity or measured its impact on organizational performance. Yet technological complexity is often identified as a major problem in product commercialization (Hagedoorn, 1993; Langlois & Everitt, 1992) and as an important motive for interorganizational cooperation (Dodgson, 1992b; Rycroft & Kash, 1994). The extensive research on alliances has not, however, produced significant empirical evidence that interorganizational cooperation improves business performance or alleviates the problems of commercializing complex technologies (Dodgson, 1992a; Smith, Carroll, & Ashford, 1995).

This study investigated the impact of technological complexity on business survival and how alliances mediate this relationship. Its central prediction is that businesses developing products of high technological complexity face a higher risk of failure—of ceasing operations and exiting their industry—than businesses developing less technologically complex products. In considering alternate explanations for the impact of technological

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complexity, I evaluated how technological change, expansion, and diversity affected the risk of failure. Finally, the study evaluated the benefits of alliances by contrasting the failure risks of businesses that independently or cooperatively developed products of varying technological complexity. Alliances were expected to moderate the failure risks of high-complexity firms but to provide few survival benefits to businesses with less complex products.

The empirical investigation builds on a conceptual discussion of technological complexity and the challenges such complexity offers organizations, the impacts of technological change and diversity, and the use of interorganizational cooperation to address these challenges. An attempt to integrate diverse literatures is extended to the empirical test, which employs a performance measure not commonly used in the study of alliances, the survival of cooperating businesses. This study examined technological complexity and alliances in the U.S. hospital software systems industry between 1961 and 1991. The results provide important evidence of the significant impact of complexity and other technological characteristics on business survival, and evidence of the utility and limitations of interorganizational cooperation.

BACKGROUND

Complexity of Technology

A complex technology is defined here as an applied system whose components have multiple interactions and constitute a nondecomposable whole.[1] Three characteristics can be extracted from this definition, each of which is necessary but insufficient: Complex technologies are systemic, have multiple interactions, and are nondecomposable. The systemic characteristic means that a complex good or technology comprises elemental units or components, usually organized in hierarchies of subsystems. This hierarchical structure causes the performance of each subsystem to be dependent on the performance of its components, while itself influencing and being dependent on the performance of higher-order systems. This structure leads to the second characteristic of complex technologies, multiple interactions. Though interactions between individual components are often simple and direct, multiple interactions and feedback between components

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[1] Despite extensive use of the terms (cf. Anderson, Arrow, & Pines, 1988; Holland & Miller, 1991; Huberman & Hogg, 1986), there is no generally accepted definition of complexity or of technological complexity. The definition presented here draws from the cited works and from Weaver (1947), Simon (1969), Perrow (1984), and Scuricini (1984). Though it may be possible to distinguish between a product and the technology it encompasses, I adopted the convenience of using the terms products, systems, and technologies interchangeably. Definitions encompass physical products as well as personal and organizational services. A useful list of complexity-related sources can be obtained at http://www.stern.nyu.edu/informs/.

within subsystems, between components across subsystems, and between subsystems at various hierarchical levels create a complicated network of "nonsimple" relationships (Simon, 1969). These interactions represent the interface between components and subsystems and embody what Henderson and Clark (1990) referred to as the architecture of a system. The network of interactions leads to the third characteristic of complex technologies, nondecomposability. A product is nondecomposable if it cannot be separated into its components without seriously degrading its capabilities or performance: "When a set of subsystems is richly joined, each variable is as much affected by variables in other subsystems as by those in its own. When this occurs, the division of the whole into subsystems ceases to have any natural basis" (Ashby, 1960: 213). Even when it is possible to identify physical or logical subsystems, it is not possible to decompose complex technologies into these subsystems while maintaining the technology at or close to optimal performance levels (Holland & Miller, 1991).

Given complex technologies' characteristics of multiple interactions and nondecomposability, consistency in system architecture and performance reliability require that components and interfaces be closely configured and perform with high reliability. The low tolerance for variation in components and interfaces arises from the fact that even minor variation in performance can be rapidly magnified through the network of interactions to cause catastrophic system failure (Perrow, 1994). These characteristics also mean that the unique combination of components and their interactions within a complex technology create outputs that are not easily reproducible with other combinations of inputs or with other configurations of the same inputs. Therefore, many or most of the components in a complex technology are highly complementary, or co-specialized (Teece, 1986).

Analyses of the technologies of nuclear power stations (Perrow, 1984), aircraft carriers (Roberts, 1990), and U.S. Army M1 tanks (Demchak, 1991, 1992) provide useful illustrations of the characteristics of complex technological systems and of their broader organizational impact. Residential lighting systems and many basic home and office appliances are examples of noncomplex systems. Organizational and social systems can similarly be viewed as varying in technological complexity with, for example, space missions being significantly more complex than post offices (Perrow, 1994).

These examples illustrate the difficulty of measuring complexity on an absolute scale. Although it is possible to rate one product or technology as more complex than another closely related product or technology, it is difficult to establish context-free measures of complexity. For example, which is more complex—a personal computer or an automobile? A high-performance camera or a software program? Most complexity measures are conceptual rather than practical and cannot be implemented without extraordinarily detailed analysis for even relatively simple products (Kline, 1991). Because of this difficulty, most studies of complexity contain relative

measures, comparing the complexity of a product or technology to that of a closely related product or technology.

Alliances

Williamson defined alliances as interorganizational relationships "in which the parties . . . maintain autonomy but are bilaterally dependent to a non-trivial degree" (1991: 271). In the present context, alliances refer to formal nonequity arrangements between independent firms. Many alliance options, with differing characteristics, are available to collaborating firms (Contractor & Lorange, 1988; Hagedoorn, 1993; Oliver, 1990; Richardson, 1972; Teece, 1992). Collaboration offers many potential benefits, such as cost sharing, sharing capabilities and resources, coordinating capabilities and activities, and expanding into new product and geographic markets and lines (Balakrishnan & Koza, 1993; Dodgson, 1992b; Hagedoorn, 1993; Harianto & Pennings, 1990; Mariti & Smiley, 1983; Mitchell & Singh, 1992; Oliver, 1990; Osborn & Baughn, 1990; Williamson, 1991). A key feature of alliances is that the collaborating firms can reap these benefits while remaining largely independent, thus continuing to enjoy the coordination and control benefits of internal integration (Williamson, 1991).

Though the alliance literature contains the argument that cooperation allows collaborating firms to achieve better performance, empirical evidence of this relationship has been limited (Dodgson, 1992a; Smith et al., 1995), with few studies providing substantial evidence of performance improvements (Balakrishnan & Koza, 1993; Berg, Duncan, & Friedman, 1982; Hagedoorn & Schakenraad, 1994). Most studies have examined corporate performance, a focus that may mask stronger business-level collaboration-performance benefits. However, collaboration carries with it the risks of information loss, organizational disruption, and adjustment difficulties, and thus is not costless (Miles & Snow, 1992; Miner, Amburgey, & Stearns, 1990; Weick, 1982; Williamson, 1991). In general, the extensive research on alliances has not provided significant empirical evidence on the likely outcomes of cooperation (Dodgson, 1992a; Smith et al., 1995).

HYPOTHESES

Technological Complexity and Business Survival

In this section, I argue that technological complexity affects business survival. Businesses developing highly complex technologies face greater difficulties than those developing less complex technologies in two areas. First, they face greater difficulty in developing the required competencies. Second, the organizational costs of commercializing high-complexity technologies are greater. Though businesses that succeed in bringing complex technologies to the market may enjoy great financial and market success, the costs and difficulties involved are high. Though businesses that develop noncomplex technologies also need to develop appropriate competencies and bear organizational and financial costs, the scale of these difficulties is

significantly greater for high-complexity technologies. Hypothesis 1 predicts that the difficulties of developing high-complexity technologies are reflected in the higher risks of failure businesses commercializing such products incur.

Competencies. The fundamental challenge that firms face in commercializing complex technologies is developing the multiple competencies required. As complex technologies are systems of many closely coordinated components, firms that independently develop these technologies must possess the ability to manufacture and coordinate many dissimilar components. Though some complex technologies combine components that draw on similar knowledge bases, most complex technologies combine components that draw from different knowledge bases (Dodgson, 1992b).

Most firms, however, have limited abilities to develop broad sets of competencies (Langlois, 1992; Nelson & Winter, 1982; Richardson, 1972). Drawing from a knowledge base to construct and refine a component is a complicated and uncertain process, and organizations must develop routines specialized to each technology or knowledge base (Nelson & Winter, 1982). Even when complementary, the knowledge bases and associated routines are often dissimilar and are often best maintained in separate organizations (Langlois, 1992; Langlois & Everitt, 1992; Richardson, 1972). Organizations are also constrained in their ability to rapidly learn and implement competencies and routines (Hannan & Freeman, 1984, 1989; Levitt & March, 1988) and to effectively perform more than a narrow range of tasks (Cyert & March, 1963; Nelson & Winter, 1982).

Organizational costs. Organizations can only achieve the degree of coordination required to manage their internal and external operations by incorporating as much variety and complexity as the processes they manage entail (Ashby, 1956, 1960; Burns & Stalker, 1961; Thompson, 1967). Since complex technologies comprise many components, subsystems, and interactions, organizations commercializing complex technologies must also comprise many differently organized but closely integrated subunits (Burns & Stalker, 1961; Lawrence & Lorsch, 1967; Roberts & Gargano, 1990). The resultant structure will be organizationally complex (Nelson & Winter, 1982) and costly to manage, staff, and operate (Demchak, 1992; Lawrence & Lorsch, 1967; Roberts, 1990).

A crucial capability for firms developing complex technologies is the maintenance of a high degree of reliability in performance. However, the complexity of the required structures makes such reliability difficult to attain (Perrow, 1984; Roberts, 1990). One way of ensuring reliability is to build in redundancy, but doing so merely increases the complexity of the structure, reduces flexibility, and ultimately, prevents the attainment of reliability (Demchak, 1991, 1992; Perrow, 1984; Roberts & Gargano, 1990).

Therefore, businesses that develop high-complexity technologies face significant competency limitations and high organizational costs. Though businesses that develop low-complexity technologies also face competency limitations and organizational challenges, those faced by high-complexity

businesses are likely to be significantly greater. These differences will be reflected in differing risks of failure.

Hypothesis 1. The greater the complexity of the technology that a business develops, the greater its risk of failure.

Alternate explanations. Despite the difficulties, many businesses will be able to develop the broad sets of competencies required for complex technologies over an appropriately long period of time, given a stable environment (Langlois, 1992). Stability will also allow organizations to routinize their complex organizational and coordination systems to effectively deal with variety in the environment. However, technological stability for any length of time is uncommon in most industries and rare in industries grounded in multiple knowledge bases or sciences (Tushman & Anderson, 1986). Instead, change is a major technological characteristic that significantly affects business performance, primarily through the challenges it poses to competencies (Cooper & Schendel, 1976; Nelson & Winter, 1982; Tushman & Anderson, 1986) and the suitability of organization structure and systems (Tushman & Romanelli, 1985). The occurrence of major technological change often destroys existing competencies and requires the redeployment of resources to develop capabilities suitable for the new technological regime (Tushman & Anderson, 1986). Additionally, nontechnological environmental changes can require technology-level changes (Tushman & Rosenkopf, 1992) and thus influence business performance. For example, changes in government regulations or in the availability of supplies or components sometimes prompt technological change, creating significant performance implications in the process. In this view, change rather than complexity is the primary technological difficulty that businesses face.

Hypothesis 2. Technological change is positively associated with the risk of business failure.

Technological change can also be viewed as arising more endogenously, as a result of changes within a business. Entry into new products or markets almost always involves the introduction of new technologies, competencies, and resources within a firm, processes that present significant technological and organizational challenges (Nelson & Winter, 1982). Businesses that undertake entry into new technologies, even those related to current activities, often suffer higher risks of failure (Mitchell & Singh, 1992, 1993). Consequently, businesses that develop or introduce new products or technologies risk higher failure rates.

Hypothesis 3. Technological expansion is positively associated with the risk of business failure.

Businesses that commercialize many products face challenges that are related to, but different from, those posed by technological complexity. Though complex technologies require broad competencies, technological diversity, like technological change, may require development of entirely new capabilities. The distinction is analogous to that drawn by March (1991;

cf. Argyres, 1996) between exploiting current knowledge and exploring new knowledge. Businesses that develop a variety of systems probably require broader competencies and incur higher organizational costs than businesses with narrower product lines (Argyres, 1996), the technological complexity of their products notwithstanding. As with technological complexity, businesses that deliver broad product lines may enhance financial and market success but have greater risks of failure.

> *Hypothesis 4. The greater the diversity of technology that a business develops, the greater its risk of failure.*

Technological Complexity and Interfirm Collaboration

This section evaluates how alliances can mitigate the higher risk of failure associated with commercializing high-complexity technologies.[2] Hypothesis 5 predicts that alliances will reduce the failure risk of highly complex technologies but will not provide a similar benefit for firms commercializing less complex technologies.

An extensive literature suggests that businesses primarily establish technology-related alliances to access competencies and other resources, or to access markets (Hagedoorn, 1993). Alliances represent a particularly useful mechanism for businesses accessing the competencies and resources required for complex technologies (Rycroft & Kash, 1994). Alliances allow sharing of competencies and resources (Contractor & Lorange, 1988; Dodgson, 1992b; Hagedoorn, 1993; Miner et al., 1990; Mitchell & Singh, 1992; Teece, 1986; Thompson, 1967), coordination of activities (Camacho & Persky, 1988; Mariti & Smiley, 1983), securing of trust and commitment (Fruin, 1992; Richardson, 1972), and the exchange of proprietary, tacit, or routine-embodied knowledge (Fruin, 1992; Harianto & Pennings, 1990). Alliances provide a framework for cooperation and facilitate exchange when market-based trading is costly (Balakrishnan & Koza, 1993; Eccles, 1981; Williamson, 1991), as it is when, for instance, the subject of exchange is specialized, intangible, inimitable, idiosyncratic, or embodied in organizational routines (Akerlof, 1970; Barney, 1986; Lippman & Rumelt, 1982; Nelson & Winter, 1982; Teece, 1981; Williamson, 1975, 1985).

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[2] There are at least three alternatives to alliances. (1) Simplify products: Re-engineering can often reduce system complexity, but it is usually not possible to reduce or eliminate the complexity of a technology without significantly degrading system performance (Holland & Miller, 1991), which is fundamentally dependent on the presence of complexity. (2) Use an external monitor: A monitor ensures the configuration and reliability of components and manages their interface, thus simplifying the interaction between organizations developing different components of complex technologies. However, it is usually beyond the ability of individual firms and possibly not in their long-term interests to appoint a monitor with adequate authority. (3) Standardize: Through the specification of conventions and interfaces, establishing standards allows independent configuration of components, substantially reducing the need for coordination and configuration. Many competitive and technical factors hinder the acceptance and implementation of standards, so few firms can unilaterally impose industry-wide standards.

If markets are potentially as efficient as hierarchies in organizing the exchange of goods (Coase, 1937; Williamson, 1975, 1985), firms unable to commercialize complex technologies independently could acquire components or competencies from other firms, thereby avoiding the need for alliances. However, the characteristics of complex technologies make market trading for them or for their significant components subject to exchange difficulties, rendering the market inefficient. The closely configured and nondecomposable nature of complex technologies cause components and, to a lesser degree, the resources used to develop those components, to be vulnerable to the well-established problems of costly contracting (Akerlof, 1970; Balakrishnan & Koza, 1993; Coase, 1937, 1960) and opportunistic trading (Williamson, 1975, 1985). Relatedly, the routines and competencies employed to commercialize complex technologies are often highly specific to organizations, tacit, and difficult to redeploy (Barney, 1986; Dierickx & Cool, 1989; Lippman & Rumelt, 1982; Teece, 1981). Market exchange will not allow close enough coupling to provide an efficient and closely coordinated interface between organizations, and it interrupts information exchange and other interdependent activities and thus hinders the close configuration of components (Camacho & Persky, 1988; Teece, 1992).

Though alliances can alleviate or overcome the difficulties of developing high-complexity technologies, the question arises as to whether low-complexity businesses will gain equally from establishing alliances. Although much of the literature on alliances suggests that such cooperation will benefit all firms (e.g., Miner et al., 1990), it is likely that the costs and incentives of collaboration for firms deploying low-complexity technologies differ from those for high-complexity firms. The former generally face fewer competency limitations and thus have less need to access other organizations' competencies and resources. Though alliances' costs are offset by associated benefits for high-complexity technologies, low-complexity businesses may not enjoy equally favorable trade-offs. If low-complexity businesses face fewer competency and organizational problems developing their products, and if alliances are not costless, it is likely that these businesses will gain less than high-complexity firms from alliances. Consequently, alliances will reduce the failure risks of high-complexity businesses more than the failure risks of low-complexity businesses.

> *Hypothesis 5. The greater the complexity of the technology commercialized by a business, the more it will reduce its risk of failure through interfirm alliances.*

DATA AND MEASURES

The Hospital Software Systems Industry

Hypotheses were tested by examining the survival of businesses in the U.S. hospital software systems industry from 1961 to 1991. This industry contains firms that develop software application systems for use in clinical and administrative departments in community hospitals. This definition

excludes businesses that develop general-purpose systems such as word processing and spreadsheet software. Hospital application software is widely viewed within the software industry as a distinct vertical market with distinct characteristics and challenges. Community hospitals are all "nonfederal short-term general and other special hospitals, excluding hospital units of institutions, whose facilities are available to the public" (American Medical Association, 1991: xxiii). This is the largest group of U.S. hospitals; approximately 3,500 were operating in 1991.

The first recorded entry of a firm dedicated to the commercialization of hospital application software occurred in 1961, with the introduction of systems to automate patient management and financial operations. Systems for other operations, such as radiology and the laboratory, were introduced in the mid-1960s. Administrative systems were widely employed by the 1970s, and clinical systems enjoyed significant market penetration in the 1980s. A total of 973 firms were identified as having commercialized hospital software systems in this industry between 1961 and 1991. I collected this data set from an extensive search of the business press, corporate and consultant reports, government publications, and other public sources, and it is as close as possible to an exhaustive list of all industry participants (sources are available on request). These firms range from *Fortune* 500 leaders to small software houses with minimal assets and employees. Almost all were established in the United States and had no foreign operations. Figure 1 provides data on annual sales (in millions of dollars deflated by the 1982 Producer Price Index) and the number of firms that have participated in the industry.

The following subsections describe the measures used in the study. Appendix A gives additional details on the measures.

Technological Complexity

The hospital software systems industry was selected for this study because its products embody varying degrees of complexity. Many hospital software systems are prime examples of complex products, because they are systemic and comprise modules that interact in multiple nondecomposable and nonsimple ways (Malvey, 1981; Minard, 1991). The complexity of these systems results from the complex structure of hospitals, heavy and changing external reporting requirements, the implementation of systems at the department level within hospitals, the need to interface with many other computer and noncomputer systems and instruments, the relative absence of standardization in hospital software and other systems, the highly qualitative and undefined nature of medical information and decision making, and the high impact of medical information on human lives (Aller, 1992; Collen, 1992; Frost & Sullivan, 1982; Malvey, 1981; Minard, 1991; Singh, 1993). Space constraints prevent an extensive discussion of the potential complexity of hospital software systems here, but Appendix B presents extracts from various sources testifying to that complexity. At the same time, some hospital software systems are used for basic transactions and embody significantly less complexity than those referred to above.

FIGURE 1
Industry Sales and Number of Firms
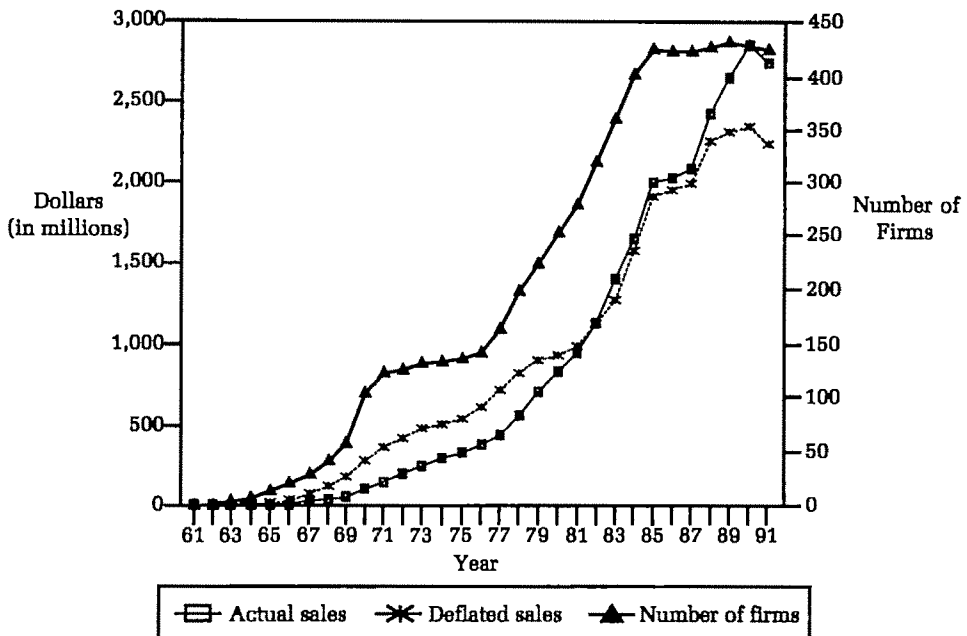
In line with most studies of complexity, in this study technological complexity was measured relatively. Using several common industry classifications (e.g., Austin, 1988; Collen, 1992), I identified 13 hospital software product-classes, including one "other" category for specialized products. A panel of 18 industry experts was asked through a mailed survey to evaluate the complexity of the 13 software product-classes on a four-point scale (not complex, limited complexity, significant complexity, and extreme complexity).[3] I chose these experts to represent three main constituencies: academics specializing in hospital information systems, vendors developing these systems, and users of hospital information systems. Despite no use of response incentives or follow-ups after the initial mailing, I received 15 usable questionnaires, representing a response rate of 83.3 percent. As the experts did not regard any of the product-classes to be noncomplex, each was categorized into one of three complexity classes: low, medium, and high.[4] Interrater reliability was significant ($\alpha = .90$). I conducted follow-up meetings that

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[3] The survey was pretested on the director of a laboratory information system in a large hospital who was concurrently an academic specializing in hospital information systems. Minor changes were made. A total of 20 industry experts were identified initially. One could not participate in the survey, and another could not be located, so the final sample numbered 18.

[4] Although a three-point measure of complexity was adopted, the hypotheses presented above only predict high- and low-complexity effects, for simplicity. Medium-complexity effects are discussed in the Results section.

lasted 40 and 60 minutes, respectively, with two respondents to verify the validity of the questionnaire and to solicit additional information.

Table 1 groups the 13 product-classes by experts' ratings of their technological complexity. Each firm was classified as participating in one or more of these complexity categories. All firms that had commercialized one or more high-complexity systems in any year were categorized as having high-complexity technology, irrespective of whether they also commercialized products of lower complexity. Similarly, businesses with at least one product of medium complexity but no high-complexity products were classified as medium-complexity businesses. Businesses with no high- or medium-complexity products were placed in the low-complexity group. After significant variation in early years, the numbers of businesses commercializing products in each category of complexity converged by the early 1980s. Table 1 also shows the number of sampled firms that had offered each product-class by 1991.

TABLE 1
Hospital Software Product-Classes

Level of Complexity and Product-Class	First Year Commercialized	Number of Businesses Offering Product by 1991	Description
High-complexity			
Patient care	1968	218	Medical records management
Bedside	1969	37	Point-of-care management
Nursing	1965	125	Nursing department management
Medium-complexity			
Clinical laboratory	1964	294	Laboratory department management and test result reporting
Pharmacy	1965	212	Inpatient and outpatient pharmacy management
Radiology	1965	148	Radiology department management; picture archiving and communications systems
Patient management	1961	258	Patient admissions, discharge, transfer, and scheduling
Operating room	1969	82	Operating room management
Low-complexity			
Accounting, business, and finance	1961	491	Financial and business office operations
Materials management	1963	170	Inventory and purchasing management
Blood bank	1967	34	Blood bank management
Dietary	1971	57	Dietary services and kitchen management
Other administrative	1966	175	Miscellaneous administration

Technological Change, Expansion, and Diversity

A sudden major environmental change occurred in 1983, with the government-mandated introduction of the Prospective Payment System for reimbursement of medical fees. Though this new system was primarily aimed at controlling medical costs, its introduction imposed many new reporting and operating constraints on hospitals and forced them to pay greater attention to efficiency and cost containment issues (Fennell & Alexander, 1993). This new focus led many hospitals to introduce new information systems with new technical capabilities (Jackson & Jensen, 1984; Palley, 1991) and required vendors to undertake major software systems modification and development (Bozeman, 1988; Collen, 1992; Dorenfest, 1988). I chose 1982–84 as the period in which a significant technological shock occurred. Two additional variables were introduced to control for more general and evolutionary technological change, which can also disrupt businesses (Tushman & Anderson, 1986). These variables indicated the years in which mainframe-based software systems dominated the hospital software market (1961–80, technology period 1); the years in which minicomputer-based systems became important (1981–88, technology period 2); and the years in which workstation- and PC-based software began to emerge (1989–91, technology period 3, the omitted class in analyses).

Technological expansion was measured with three indicator variables: new product, new product lagged one year, and new product lagged two years. These variables indicated when a business first entered a new product-class and each of the following two years. The use of these three variables allowed the effects of technological expansion to be detected over a three-year period. Technological diversity was measured by the total number of high-, medium- and low-complexity product-classes each business commercialized in each year of the study period, as diversity in high-complexity technologies is likely to have greater impact on survival than variety in low-complexity technologies.

Alliances

The collection of alliance data was a major challenge, in view of the 31-year coverage of the study and the large number of businesses in the industry. I identified alliances from announcements of cooperation between firms, a method used for other data sets, such as MERIT-CATI (Hagedoorn, 1993; Hagedoorn & Schakenraad, 1994). This approach, which has been widely used, rests on the assumption that media sources will report most alliances. Three factors suggest that this is a reasonable assumption in the present case. First, the hospital software systems industry lies at the crossroads of the medical and computer industries, both of which are widely reported on. Second, most significant interfirm agreements are formal and legally binding and thus are usually publicly known. Third, collaborating firms' motives are usually better served by publicity, leading most businesses to publicize their agreements. Though there must have been some

private or unreported agreements, it is likely that they were few and insignificant.

I recorded 693 collaborative relationships between 248 businesses, indicating that although approximately 25 percent of the 973 industry participants established an average of 2.8 alliances each, 75 percent of the industry's participants did not establish any cooperative links. A comparison of businesses that established at least one alliance with those that did not establish any alliances indicated that those that did not establish alliances were significantly smaller at the time of their industry entry. However, they did not differ significantly in other respects, such as the types of hospitals for which they developed software or the technological "platforms" (types of computers used) for which their products were developed. The empirical analysis controls for possible size effects.

The primary purpose of each alliance as reported by the cooperating businesses was also recorded; each alliance was thus categorized as a technology, licensing, marketing and distribution, value-added reseller, or other alliance. I classified those related to joint R&D, to the development of interfaces, or to other technological issues as technology alliances. A total of 105 (15%) of the alliances were classified as technology related. For the purposes of the present study, I considered all other alliances as nontechnology alliances. The multiplication of the two types of alliances with the three complexity variables created six indicator variables: high-complexity technology alliance, high-complexity nontechnology alliance, medium-complexity technology alliance, medium-complexity nontechnology alliance, low-complexity technology alliance, and low-complexity nontechnology alliance. The set of alliances omitted ten cases in which businesses created freestanding joint ventures, which were treated as independent businesses rather than as alliances because their characteristics and structures differ (Hagedoorn, 1993; Williamson, 1991).

Information on two aspects of alliances was difficult to obtain. First, it was difficult to identify terminations, as there are few reports of the cessation of cooperation. This problem is common to most alliance studies and databases (Gulati, 1995; Hagedoorn, 1993; Hagedoorn & Schakenraad, 1994); no major empirical study of alliances has been able to obtain information on alliance termination. The approach adopted in this study, which measures the establishment rather than the current existence of alliances, is commonly used to overcome this problem (e.g., Gulati, 1995). The effects of this assumption are, however, conservative relative to the hypothesized relationship: if in fact most alliances were terminated quickly, they could not have provided the desired benefits and would have had limited impact on survival, thus providing less support for Hypothesis 5. The second aspect of alliances on which information was not available was the quality of the collaborations. Well-executed relationships would have influenced survival more significantly than ineffective alliances, but such data were unavailable. However, the large number of alliances studied should ensure that the data represent a broad range of collaboration quality.

Business Survival

.   This study uses business survival as its performance measure. Though survival is not perfectly correlated with profit (Schaffer, 1989) or market share as a measure of performance, it offers several advantages. Survival is more tractable and less ambiguous than financial performance, and it can be established more readily for private firms and for divisions of multibusiness corporations. Business survival is also of interest to managers, competitors, communities, and other stakeholders (Hannan & Freeman, 1989).

Survival was measured as a firm's participation in the industry. In most cases, it was possible to confirm from corporate reports, business histories, and industry experts that the first year of recorded participation was, in fact, a firm's first active year in the industry. In about 14 percent of cases, I estimated the year of entry as the year in which the business first appeared in an industry report, following the usual procedure in survival studies. Business failure was similarly based on industry reports. Failure was recorded when a business discontinued operations and ceased to operate as an entity. A dummy variable recorded each firm's participation in the industry; for each year, it was coded 1 for industry exit and 0 for no exit. By the end of the study, 316 (32.5%) of the 973 businesses had exited the industry.

This definition of failure corresponds to that of dissolution used in most studies of failure. Cases in which a business sold a majority of its equity to another firm but continued to operate in the industry, either independently or as part of the other firm, were treated as divestments, not failures. Though dissolution and divestment exits are often combined in studies of firm failure, the dynamics of exit differ for businesses that cease operations and for those that continue to operate after acquisition (Mitchell & Singh, 1993).[5]

Other Covariates

A range of covariates was used to control for business and industry factors that may have influenced business survival. These covariates are listed and defined in Appendix A. Two dummy variables indicated whether systems were commercialized for large and medium hospitals, as the expert survey and the medical literature (Aller, 1992; Malvey, 1981) indicated that hospital size is an important influence on system complexity. Dummy variables indicated whether a business commercialized products for mainframe or minicomputer platforms, to account for significant differences in developing systems for these platforms (Austin, 1988). Two dummy variables were also used to distinguish between firms with and without experience in computer hardware operations or software development outside the hospital industry, to control for effects of generalist activities and broad experience

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[5] This observation raises the question of the applicability of the above hypotheses to exits by divestment. Do businesses that develop high-complexity technologies face higher risks of being divested (i.e., of being acquired) than businesses developing less complex technologies? And how do alliances impact the acquisition risks of firms developing high- and low-complexity technologies? These issues are left for future investigation.

(Hannan & Freeman, 1989). The risk of business exit has been shown to decline with size (Aldrich & Auster, 1986) and age (Hannan & Freeman, 1989). Variables were introduced to control for these effects. Industry-related covariates included controls for the effects of market size and market growth on the likelihood of survival (Hannan & Freeman, 1989). Table 2 provides summary statistics for all independent variables.

Statistical Methods

I calculated binomial regression estimates of the influence of explanatory variables on the likelihood that a business would exit the industry in each year. The models took the form Ln $P/(1 - P_i) = \beta X_i$, where P_i is the probability that business i will exit the industry during a year. The logarithmic odds of this event are held to be linearly affected by a vector of covariates X_i with coefficient vector β. A one-unit change in covariate j alters the probability that a business will exit the industry by $\beta_j P_i (1 - P_i)$. I used the SAS statistical package to estimate the maximum likelihood models.

Logistic regression techniques were used as this approach allows the use of annually varying covariates, an important consideration in a study spanning 31 years. Logistic regression analysis, however, is based on the assumption that each case is independent, which is not true in the present study, as each business would have a record for each year it survived in the industry. Hosmer and Lemeshow (1989) argued that as long as the conditional probabilities of events occurring in each time period are small, logistic regression analysis produces robust estimates with this data structure. This condition is met in the present study, as exits occur in 4.7 percent of all cases. Teachman, Tedrow, and Hill (1993) showed that the discrete time logistic regression estimator does not downwardly bias standard errors when compared to continuous time models and that spell splitting does not lead to unobserved correlation across records.

RESULTS

Table 3 shows the numbers of firms that had commercialized high-, medium-, and low-complexity software systems by their time of failure or by the end of the study, with or without establishing alliances; the table also shows the numbers of firms that failed and survived. Without controlling for other factors, the simple cross-tabulation suggests that businesses with alliances had higher survival likelihoods than businesses without alliances at each level of technological complexity.

Table 4 reports the results of the tests of hypotheses. The first model is the baseline analysis of the effects of control variables on the probability of failure. Hospital size affected exit risks, with businesses developing systems for large hospitals having lower survival probabilities. The complexity of the large-hospital environment probably poses significantly greater difficulties for software systems developers, increasing the risks of product and business failure. Experience outside the industry did not aid survival, as businesses

TABLE 2
Summary Statistics and Pearson Correlations[a]

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9
1. High-complexity firm	0.26	0.44									
2. Medium-complexity firm	0.45	0.50	-.53								
3. Low-complexity firm	0.29	0.48	-.38	-.58							
4. High-complexity technology alliance	0.02	0.15	.27	-.14	-.10						
5. High-complexity nontechnology alliance	0.07	0.25	.46	-.25	-.18	.39					
6. Medium-complexity technology alliance	0.02	0.16	-.09	.18	-.10	-.03	-.04				
7. Medium-complexity nontechnology alliance	0.05	0.22	-.14	.26	-.15	-.04	-.06	.20			
8. Low-complexity technology alliance	0.00	0.07	-.04	-.06	.11	-.01	-.02	-.01	-.02		
9. Low-complexity nontechnology alliance	0.03	0.18	-.11	-.17	.28	-.03	-.05	-.03	-.04	.24	
10. Technology shock	0.17	0.38	-.03	-.01	.04	-.02	-.05	-.01	-.01	.02	-.01
11. Technology period 1	0.26	0.44	-.06	.08	-.03	-.04	-.10	-.02	-.04	-.01	-.07
12. Technology period 2	0.47	0.50	-.02	-.01	.03	-.01	-.02	-.01	-.01	-.01	-.02
13. New product	0.08	0.27	.17	-.09	-.07	.09	.13	-.01	.02	-.02	-.03
14. New product, one-year lag[b]	0.08	0.27	.16	-.09	-.08	.09	.14	-.02	.00	-.01	-.01
15. New product, two-year lag[c]	0.08	0.27	.15	-.09	-.05	.09	.09	.13	-.02	-.00	.00
16. Number of high-complexity systems	0.33	0.61	.91	-.49	-.35	.34	.51	-.09	-.12	-.04	-.10
17. Number of medium-complexity systems	0.97	1.15	.35	.19	-.54	.26	.38	.07	.09	-.08	-.15
18. Number of low-complexity systems	0.95	0.83	.27	-.37	.15	.16	.25	-.05	-.03	.01	.09
19. Large hospitals	0.63	0.48	-.02	-.01	.03	.02	-.01	.02	.03	.03	.02
20. Medium hospitals	0.26	0.44	.06	-.01	-.06	.01	.02	-.00	-.01	-.02	-.01
21. Small hospitals	0.11	0.32	-.04	.02	.02	-.05	-.02	-.03	-.02	-.02	-.01
22. Mainframe systems	0.32	0.47	.13	-.16	.04	.11	.11	-.01	-.01	-.02	.03
23. Minicomputer systems	0.60	0.49	.01	.08	-.10	.03	.09	.02	.06	.03	-.02
24. Workstations and PCs	0.50	0.50	-.04	-.05	.09	-.05	-.03	-.00	.02	-.02	.03
25. Hardware operations	0.06	0.23	.00	.05	-.05	-.02	.01	.09	.03	.06	.03
26. Other software operations	0.82	0.39	.02	.07	-.10	.01	.02	-.05	-.00	-.02	-.03
27. Firm size[d]	-0.05	1.52	.24	-.01	-.22	.19	.31	.08	.14	.02	.04
28. Business experience	5.46	4.34	.15	-.03	-.11	.14	.24	.08	.15	.02	.07
29. Business experience squared	48.64	82.82	.17	-.04	-.11	.14	.24	.04	.14	.01	.05
30. Market size[d]	7.12	0.75	.08	-.08	.01	.05	.13	.02	.06	.00	.08
31. Market growth	0.13	0.27	-.04	.01	.02	-.02	-.06	-.01	-.03	-.00	-.04

[a] $N = 6,703$. All $r > + .03$ or $< -.03$ are significant at $p < .01$.
[b] $N = 6,702$.
[c] $N = 6,701$.
[d] Variable is a logarithm.

with hardware operations had higher risks of dissolution. External software operations did not moderate failure risks, suggesting that commercializing hospital software demands different technical and market competencies than does commercializing other types of software. Business experience had the well-established nonmonotonic effect, with the likelihood of failure first rising with age, then declining. Dissolution risks also declined with business size and with market growth. The base model is statistically significant, as shown by the logarithmic likelihood ratio chi-square.

The second model presents the results of the tests of Hypotheses 1 through 4. Businesses commercializing technologies of high and medium complexity had significantly higher risks of failure than businesses commercializing low-complexity technologies (the omitted category), supporting Hypothesis 1. This result demonstrates that technological complexity is a significant influence on the likelihood of survival.

The results provide only limited support for the impact of technological change (Hypothesis 2). The technology shock variable was significant but

TABLE 2 (continued)

10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
-.27																					
.49	-.55																				
.04	.02	.06																			
.02	.01	.05	.05																		
.01	-.00	.04	.04	.05																	
-.03	-.08	-.01	.19	.20	.18																
-.02	-.03	.01	.22	.23	.22	.48															
.01	-.03	.03	.21	.21	.21	.34	.35														
-.03	.11	-.06	.01	.02	.02	-.01	.04	.02													
.01	-.04	.02	-.01	-.01	-.01	.06	-.02	-.04	-.77												
.04	-.10	.07	-.01	-.01	-.01	-.07	-.03	.03	-.46	-.21											
-.04	.26	-.10	.06	.06	.07	.15	.14	.17	.28	-.20	-.15										
.06	-.03	.09	.04	.04	.04	.05	.17	.13	-.03	.09	-.07	-.11									
.03	-.53	.14	-.04	-.05	-.04	-.06	-.15	-.11	-.11	-.01	.19	-.31	-.23								
-.03	.14	-.06	.03	.03	.03	.02	.12	.07	.12	-.07	-.09	.10	.01	-.12							
.03	-.28	.10	-.02	-.01	-.01	.00	.00	-.12	-.15	.08	.11	-.23	.03	.23	-.52						
-.09	.11	-.13	.07	.11	.13	.33	.46	.34	.11	-.04	-.12	.26	.19	-.23	.23	-.25					
-.05	-.18	-.04	.00	.04	.06	.21	.34	.29	-.02	.05	-.04	.08	.15	-.02	.12	-.07	.50				
-.03	-.15	-.03	.04	.06	.07	.24	.36	.30	-.02	.06	-.05	.09	.15	-.02	.14	-.07	.42	.93			
.06	-.79	.23	-.04	-.02	-.00	.10	.04	.03	-.10	.04	.10	-.28	.03	.53	-.15	.31	-.05	.24	.19		
.11	.26	-.04	.02	.01	.01	-.04	-.03	-.01	.04	-.01	-.04	.12	-.05	-.18	.10	-.14	-.01	-.13	-.09	-.51	

positive, indicating that the risk of business failure did not decrease during the period of significant technological change. It is probable that although the shock caused uncertainty for hospitals and created significant technological challenges, the effects for software developers were positive in that they created expectations of future demand for new software systems (*Hospitals*, 1984). However, the technology change variables were negative and significant, indicating that failure risk was higher in the first two technological periods than in the period when workstation- and PC-based software systems were introduced in hospitals.

The positive coefficients for the new product variables showed that businesses that introduced new technologies to the market significantly reduced their risks of failure in the year of introduction and in the following year, contrary to Hypothesis 3. However, no survival benefits were apparent by the third year, suggesting that the benefits of new technologies fade quickly. Hypothesis 4 received partial support. Technological diversity did not affect businesses with high- or medium-complexity technologies but had a negative impact on businesses with low-complexity technologies. Collectively, these results show that when complexity is controlled for, technological diversity and change do not significantly reduce business survival. It is probable that the competencies and organizational systems required for

TABLE 3
Cross Tabulation of Technological Complexity and Business Failure

Technological Complexity	Businesses with Alliances		Businesses without Alliances		All Businesses		All Businesses
	Survived	Failed	Survived	Failed	Survived	Failed	All Businesses
High	106 (89.8%)	12 (10.2%)	111 (64.5%)	61 (35.5%)	217 (74.8%)	73 (25.2%)	290 (29.8%)
Medium	67 (83.8%)	13 (16.2%)	201 (57.9%)	146 (42.1%)	268 (62.8%)	159 (37.2%)	427 (43.9%)
Low	40 (80%)	10 (20%)	132 (64.1%)	74 (35.9%)	172 (67.2%)	84 (32.8%)	256 (26.3%)
Total	213 (85.9%)	35 (14.1%)	444 (67.1%)	281 (32.9%)	657 (67.5%)	316 (32.5%)	973 (100%)
All businesses	248 (25.5%)		725 (74.5%)		973 (100%)		

ª All percentages sum horizontally, except for those in the last column, which sum vertically.

complex technologies are useful in allowing businesses to deal with the challenges of developing diverse technologies. The addition of complexity and the other technology variables improved the model, as shown by the increase in the likelihood ratio statistic.

The third model in Table 4 shows results of the test of Hypothesis 5, which was carried out through introduction of the alliance variables. Me-

TABLE 4
Logistic Regression Estimates of Influence on the Likelihood of Survival[a]

Explanatory Variable	1: Baseline Model b	s.e.	2: Model for Complexity Effects b	s.e.	3: Model for Alliance Effects b	s.e.
High-complexity firm			−1.17*	0.49	−1.19*	0.49
Medium-complexity firm			−0.67**	0.20	−0.71**	0.21
High-complexity technology alliance					0.74	0.76
High-complexity nontechnology alliance					0.22	0.36
Medium-complexity technology alliance					1.03†	0.61
Medium-complexity nontechnology alliance					0.48	0.36
Low-complexity technology alliance					−0.58	0.79
Low-complexity nontechnology alliance					0.13	0.40
Technology shock			0.41†	0.22	0.42†	0.22
Technology period 1			−0.60†	0.32	−0.58	0.32
Technology period 2			−0.49**	0.17	−0.48**	0.17
New product			2.14	0.59	2.12**	0.59
New product, one-year lag			0.59†	0.30	0.57†	0.30
New product, two-year lag			−0.15	0.23	−0.16	0.23
Number of high-complexity systems			0.50	0.43	0.49	0.43
Number of medium-complexity systems			−0.00	0.09	−0.03	0.09
Number of low-complexity systems			−0.21*	0.10	−0.22*	0.10
Large hospitals	−0.53*	0.21	−0.59**	0.21	−0.62**	0.21
Medium hospitals	−0.07	0.23	−0.12	0.24	−0.16	0.24
Mainframe systems	−0.23†	0.14	−0.29*	0.14	−0.31*	0.14
Minicomputer systems	−0.13	0.12	−0.10	0.13	−0.10	0.13
Hardware operations	−0.67*	0.30	−0.48	0.30	−0.51†	0.30
Other software operations	0.14	0.19	0.27	0.20	0.28	0.20
Firm size[b]	0.62**	0.05	0.68**	0.06	0.67**	0.06
Business experience	−0.44**	0.06	−0.43**	0.06	−0.43**	0.06
Business experience squared	0.02**	0.00	0.02**	0.00	0.02**	0.00
Market size[b]	0.29**	0.11	−0.03	0.20	−0.06	0.20
Market growth	2.52**	0.67	1.97	0.78	1.93*	0.78
Intercept	2.88**	0.85	6.05**	1.57	6.30**	1.60
Likelihood ratio test (df)[c]	209.4 (11)**		270 (22)**		279.2 (28)**	
Increase in model log likelihood			60.6 (11)**		9.2 (6)	

[a] A negative sign indicates a lower likelihood of survival. Data include 6,703 record years, 316 firm failures, and 248 firms with alliances.

[b] Variable is a logarithm.

[c] The likelihood ratio test statistic is defined as −2 times the difference between the log likelihoods of the estimated model and a model containing only the intercept. This statistic is distributed as a chi-square, with degrees of freedom equal to the number of covariates in the estimated model. The increase in model log likelihood tests whether incrementally nested models add explanatory power and is based on log likelihood differences between the two nested models, with degrees of freedom equal to the number of additional covariates.

† $p < .10$, two-tailed tests of coefficients, one-tailed tests of likelihood ratio

* $p < .05$, two-tailed tests of coefficients, one-tailed tests of likelihood ratio

** $p < .01$, two-tailed tests of coefficients, one-tailed tests of likelihood ratio

dium-complexity-technology firms with technology alliances had lower risks of failure than other businesses, partially supporting Hypothesis 5. Neither technology nor nontechnology alliances had positive survival impact for firms commercializing high- or low-complexity technologies. In general, the results indicate that alliances have only limited benefits in terms of business survival.

Sensitivity analysis. The first test evaluated the sensitivity of results to the experts' classification of product-classes. The complexity of each product-class was based on the mode, the classification most selected by the experts. If the mean reported response was used instead of the mode, one high- and one low-complexity product-class would be reclassified as medium complexity. The results of both hypotheses were unchanged with this reclassification, though the significance levels of key variables generally improved. This pattern suggests that the results are robust to marginal reclassification of technologies within the classification scheme adopted.

In another test, I introduced indicator variables to identify start-ups, privately held businesses, and businesses that had operated under different ownership prior to entry, to control for influences on business survival. Other analyses evaluated the impact of industry and environment controls, including annual expenditures by U.S. community hospitals, annual admissions to these hospitals, the total number of hospital beds available, and yearly U.S. business failures. These variables provide different measures of the munificence of the hospital industry and of the general state of the economy. The year of entry of each business was introduced to the analysis to measure the impact of the environment at the time of industry entry. Finally, binary variables were used to indicate cases for which entry and exit dates were estimated. None of the results reported were materially affected by the inclusion of these variables.

DISCUSSION AND CONCLUSION

The results of this study clearly show that technological complexity is a significant influence on business failure. Businesses commercializing high- and medium-complexity technologies face higher risks of dissolution than low-complexity businesses. Though high-complexity technologies may promise financial and market success, this potential comes at the cost of higher risk of business failure. Although managers and theorists are not likely to view this result as a radical proposition, the relatively limited empirical attention that technological complexity has received suggests that its critical characteristics often go unrecognized or unmeasured. Instead, commercialization problems often appear to be associated with the newness, diversity, or sophistication of technology, all of which are distinct from complexity. This study suggests that complexity, rather than change or diversity, may be the major technological challenge for businesses.

The results also suggest that businesses should evaluate technological expansion with some care. Though the introduction of new technologies

improves survival probabilities, these benefits do not extend beyond the short term. Given the costliness of hospital software systems, the degree of effort required to develop and implement these systems, and their longevity once in use, this low positive impact is somewhat surprising. For high- and medium-complexity firms, diverse technology lines were not associated with improved survival. Low-complexity-technology businesses suffered a reduction in survival probability with increased technological diversity, possibly because the rewards from this strategy cannot compensate for the greater associated organizational and competency demands.

At one level, the complexity-survival trade-off can be viewed as merely reflecting the well-known risk-return relationship. From a more general organizational strategy perspective, however, this finding provides broad support for the view that businesses face significant challenges in marshaling resources to move their products through the commercialization process toward market success. The few survival benefits from expanding the portfolio of technologies offered and from introducing new technologies is consistent with this perspective. The persistence of commercialization difficulties well into the industry's maturity suggests the existence of significant constraints on resource and competency acquisition and transfer, in line with organizational and economic perspectives on strategy. The occurrence of this problem in a context with relatively low capital intensity further confirms the central role of tacit, human-capital-embodied resources in technology- and knowledge-intensive industries (Dodgson, 1992b).

A somewhat surprising result was the finding that a major technological shock had the effect of reducing risk of failure, contradicting the common view that change creates uncertainty and increases failure risk. This finding is strongly rooted in the view that technological shocks offer business-level opportunities, particularly if the changes enhance rather than destroy the value of existing assets (Tushman & Anderson, 1986). However, this finding is clearly context-specific.

This study demonstrates that some businesses can moderate technological challenges by collaborating with other firms on technological issues. However, this result is conditioned on a technology's being appropriately complex. Moderate levels of complexity will allow businesses to benefit from collaboration, without the complexity overwhelming the gains from collaboration, or the costs of collaboration offsetting potential benefits. One interpretation of this result is that low-complexity technologies pose relatively few challenges, so that the gains from collaboration do not offset the costs associated with establishing and maintaining alliances. A complementary interpretation is that firms with low-complexity technologies face relatively low risks of failure, so that the gains from alliances do not significantly reduce these risks. The higher risks of failure faced by businesses commercializing medium-complexity technologies also suggests that public policy makers should adopt a more lenient view of collaboration among such firms. The risks of potential collusion should be balanced against the public benefits that result from fewer failures among firms commercializing these tech-

nologies. High-complexity businesses should evaluate the benefits of alliances more critically. The challenges of developing high-complexity technologies may be so great that alliances are unsuitable devices for ensuring that appropriate resources and competencies are committed to the process. It is probable that developing high-complexity technologies requires closer integration and more focused commitment than can be obtained through the cooperation of otherwise independent firms. Yet the independent development of complex technologies is a risky proposition carrying a high risk of failure. It is clear that businesses developing complex technologies face significant managerial challenges that require the balancing of significant trade-offs at the technology, organization, and strategy levels.

These results provide only partial support for the widely accepted proposition that collaboration improves the performance of allied firms. This finding is notable for two reasons. First, the proposition that alliances have positive business-level performance impact has not received adequate empirical evaluation (Dodgson, 1992b; Smith et al., 1995). Second, although supporting this proposition, this study suggests that there are significant limits to business performance gains from collaboration, a finding consistent with other reports of limited benefits from cooperation (Hagedoorn & Schakenraad, 1994). Alliances are not necessarily valuable for all firms or in all circumstances. On the contrary, they may only be beneficial under relatively narrow circumstances. It is particularly notable, for example, that this study indicated that non-technology-related alliances have no survival benefits for complex-technology-related challenges. Practitioners should evaluate the organizations to be involved and the financial and information costs of collaboration in every case. From a theoretical perspective, there is clearly a need for more critical and empirical examination of the costs and benefits of collaboration. Though in this study I did not attempt to measure the costs and benefits of alliances, results suggest that the costs are not insignificant, while the benefits can vary significantly.

The results also show that organizational form can influence business survival. In particular, they suggest the existence of trade-offs in the organization of complex technologies. Some businesses can simplify this process and their organizational structures by assigning or outsourcing some activities to other organizations. This approach to complex technologies simplifies intraorganizational processes, replacing them with interorganizational ones. Therefore, the internal simplification for the focal organization comes at the expense of introducing more complex external interorganizational relationships. Organizations adopting this approach must appreciate the need to redeploy resources to support interorganizational activities and alliance management competencies. This argument can be extended to alliances that are not driven by technological complexity. For example, two firms that pool resources to enter a market for a noncomplex product would also have to evaluate potential benefits against the need to invest in coordination activities. Further, all organizations should pay close attention to managing multiple interactions and achieving close coordination and high

reliability both internally and externally. Doing so at the product component, manufacturing process, and organizational levels should provide significant benefits irrespective of the complexity of underlying systems. Managing these processes to achieve the desired integration, coordination, and reliability with appropriate organization systems, so that benefits are not overwhelmed by associated costs, is a significant managerial challenge.

Few studies have attempted to measure the effects of technological complexity on the survival of firms. The strong relationships this study established between complexity and survival, despite the breadth of these constructs and the somewhat indirect measure of complexity used here, suggest the existence of strong links between these fundamental organizational characteristics. There is clearly a need to directly introduce or control for the effects of technological complexity in studies of organizational performance. Though the importance of technological complexity has long been accepted (e.g. Thompson, 1967; Woodward, 1965), few empirical studies actually use this concept.

The results also support the long-held view that organizations are usefully evaluated as complex systems. Attempts have been made recently to describe organizations as chaotic (e.g., Thiétart & Forgues, 1995). Though the metaphor of organizations as chaotic systems may prove to be useful, it is conceptually somewhat misleading. Describing and evaluating organizations and interorganizational relations as complex systems may provide a more useful and realistic approach to the study of organizations.

This study represents an effort to adopt a broad and integrative explanation for interorganizational cooperation. Focusing on a largely technological explanation for business performance and cooperation, I attempted to incorporate issues pertaining to organizational competencies and structure. In addition, I adopted a relatively uncommon approach in the analysis of alliances. The use of business survival as a measure of performance in a study of firms commercializing products over more than three decades provided a rich empirical context for evaluating alliance effectiveness. As a broad range of motives drive alliances, such integrative perspectives are essential.

The results reported here suggest many areas for further research. The definition and measurement of technological complexity clearly require development toward less subjective and less context-dependent measures. It would be useful to incorporate information on the effectiveness of alliances and on their termination in order to more accurately measure their benefits. If technological complexity is a strategic variable—a result of the strategy, technology, and commercialization choices businesses make—the question arises as to why many businesses establish alliances when the benefits to be derived may be few. At the same time, it would be useful to understand why most businesses do not use alliances. It is likely that firm-specific and industry-embedded conditions affect decisions about alliances and other decisions pertaining to business cooperation. The features of software in general and of hospital software in particular undoubtedly affect technological

characteristics and product commercialization. Additional studies to extend the generalizability of these findings are necessary.

It would also be useful to identify strategies other than alliances that businesses have employed to overcome the challenges of commercializing complex technologies. Information on the types and purposes of alliances at the business level would also provide more reliable performance information. Establishing direct links between alliances and other measures of organizational performance, such as profitability, would provide complementary evidence of the value of alliances. Incorporating partners' competencies, characteristics, and performance would more directly establish the gains to be reaped from alliances. Many of the businesses in the present sample established overlapping alliances. Despite recent attention to the analysis of networks, relatively little empirical evidence is available on the performance impact of webs of alliances. The long-recurring calls for the establishment of clear links between organizational performance and cooperation demonstrate that much work remains to be done to clarify this most basic of themes in the alliance literature.

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APPENDIX A

Definition of Variables[a]

Failure: Firm ceased operations and exited the industry; firms still in the industry in 1991 were treated as censored (IV, TV).

High-complexity firm: The firm developed at least one high-complexity hospital software system. It may also have commercialized medium- or low-complexity systems (IV, TV).

Medium-complexity firm: The firm developed at least one medium-complexity hospital software system but no high-complexity systems. It may also have developed low-complexity systems (IV, TV).

Low-complexity firm: The firm only developed one or more low-complexity hospital software systems (IV, TV; this was the omitted dummy variable for complexity of technology).

High-complexity technology alliance: High-complexity-technology firm with at least one technology-focused alliance (IV, TV).

High-complexity nontechnology alliance: High-complexity-technology firm with at least one alliance not primarily focused on technological development (IV, TV).

Medium-complexity technology alliance: Medium-complexity-technology firm with at least one technology-focused alliance (IV, TV).

Medium-complexity nontechnology alliance: Medium-complexity-technology firm with at least one alliance not primarily focused on technological development (IV, TV).

Low-complexity technology alliance: Low-complexity-technology firm with at least one technology-focused alliance (IV, TV).

Low-complexity nontechnology alliance: Low-complexity-technology firm with at least one alliance not primarily focused on technological development (IV, TV).

Technological shock: 1982–84 (IV, TV)

Technology period 1: 1961–80 (IV, TV)

Technology period 2: 1981–87 (IV, TV)

Technology period 3: 1988–91 (IV, TV; this was the omitted class).

New product: The first year in which a firm participated in a new product-class (IV, TV).

New product, one-year lag: The year after a firm first participated in a new product-class (IV, TV).

New product, two-year lag: The second year after a firm participated in a new product-class (IV, TV).

Number of high-complexity systems: The number of high-complexity-technology product-classes for which a firm developed systems, measured at the end of each year (TV).

Number of medium-complexity systems: The number of medium-complexity-technology product-classes for which a firm developed systems, measured at the end of each year (TV).

Number of low-complexity systems: The number of low-complexity-technology product-classes for which a firm developed systems, measured at the end of each year (TV).

Large hospitals: The firm commercialized systems for hospitals with more than 350 beds. It may also have commercialized systems for medium and small hospitals (IV, TV).

Medium hospitals: The firm commercialized systems for hospitals with 100–349 beds. It may also have commercialized systems for small hospitals, but not for large hospitals (IV, TV).

Small hospitals: The firm commercialized systems for hospitals with fewer than 100 beds only (IV, TV; omitted dummy variable for hospital size).

Mainframe systems: The firm commercialized software systems for mainframe computers. It may also have commercialized systems for minicomputers and personal computers (IV, TV).

Minicomputers: The firm commercialized software systems for minicomputers but not for mainframes. It may have commercialized systems for personal computers (IV, TV).

Workstations and personal computers: The firm commercialized software systems for worksta-

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[a] IV = an indicator variable; these were coded 0/1, with 1 indicating the quality being measured was present. TV = a time-varying variable. F = a fixed variable.

tions and personal computers only (IV, TV; omitted dummy variable for type of computer systems).

Hardware experience: The firm commercialized computer hardware (IV, TV).

Other software experience: The firm commercialized nonmedical software (IV, TV).

Firm size: Logarithm of annual hospital software systems sales in millions of dollars deflated by the 1982 Producer Price Index (TV).

Business experience and experience squared: Years the firm operated in any industry and a squared term (TV).

Market size: Logarithm of total hospital software sales, less each firm's sales, in millions of dollars deflated by the 1982 Producer Price Index (TV).

Market growth: One-year growth rate of market sales, measured as a proportion (TV).

APPENDIX B

Complexity of Hospital Information Systems

(1) "One reason the healthcare industry has not been on the leading edge of information technology is because the task of automating a hospital is so enormous. Not only do hospitals generate a tremendous amount of data, but there are long-standing incompatibilities between departments that have nothing to do with technology. Radiology sees the world in terms of films for example, and pharmacy sees it in terms of weights and measures" (Kindley, 1991: 112).

(2) ". . . a hospital is a relatively small business in terms of gross revenues as compared to large corporations. For example, a hospital might have $20 million in gross revenues, yet the hospital might have 125 cost centres, aggregated into 40 or 50 different cost centres with hundreds of employees and multiple units of service in different departments in addition to all of the reimbursement considerations. When you combine all of these factors, you end up with some unique volumes of data and operating characteristics. A $20 million manufacturer might have four product lines, five departments, and 38 employees. Obviously a hospital with the same gross revenues (as a manufacturer) is a much more complex environment" (Marc Rubinger, cited in *National Report on Computers and Health*, 1982: 2).

(3) "The real problem in health-care [software] systems is that each and every department in each and every hospital is different . . . , You won't find two entities that have implemented the same system the same way" (Ed Archer, cited in LaPlante, 1993: 56).

(4) "A single order for patient care generates multiple discrete information transfers which may vary from several to several dozen individual transfers . . . an order for a single, non-narcotic drug may produce 26 different information transfers, including the courier/messengers used to route the paper documents from one department to another, in order to execute and document the order . . . The important point, however, is that each initiation of a service will result in multiple information transfers. The other important point regarding the information flow in the hospital is that it varies for each patient and, therefore is very difficult to organize for increased efficiency" (Frost & Sullivan, 1982: 95–96).

(5) "While the laboratory does not appear to represent a complex information systems problem to laboratorians, it represents one of the most complex and difficult challenges in real-time, on-line system development ever accepted outside the public sector. To reiterate, more than half the hospitals who endeavored to respond to the challenge of in-house system development completely failed in that endeavor" (Johnson, 1975: 412).

(6) "A blood bank system is so complex that it is literally impossible to fully test every possible combination of dictionary entries and decision points within the programs" (Aller, 1992: 61).

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AN EMERGENT THEORY OF STRUCTURE AND OUTCOMES IN SMALL-FIRM STRATEGIC MANUFACTURING NETWORKS

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This article presents the results of a comparative study of two networks
of small- to medium-sized manufacturing enterprises in the U.S. wood
products industry. Qualitative and survey data were collected from a
sample of active participants in each network as well as from a sample
of firms that were not network members (market firms) in the same
industry. Using both qualitative and network analysis methodologies,
we developed a model and testable propositions concerning key aspects
of network structure and outcomes.

In 1992, four member firms of the Kentucky Wood Manufacturers' Network won a $2.5 million contract with Disney World in Florida; in that same year, ten electronics manufacturers, members of Team Nashua Network in southern New Hampshire, obtained a $1.2 million contract with Compaq Computers (Lipnack & Stamps, 1993; Selz, 1992). Despite a historically competitive and individualistic business environment in the United States, small- and medium-sized enterprises (SMEs) have begun to participate in ongoing cooperative, multifirm interorganizational relationships modeled after northern Italian industrial districts and Danish networks (Inzerilli, 1990; Nielsen, 1993). Like their European counterparts, U.S. small-to-medium-sized-enterprise (SME) networks do not replace competitive relationships, but operate alongside those relationships, allowing designated collaborators to cooperate on certain projects and to compete on others (Bosworth & Rosenfeld, 1992; Perrow, 1992).

Small-and-medium-sized-enterprise networks have many similarities to their European counterparts but are conceptually distinct from other types of interorganizational arrangements commonly found in the United States, like joint ventures, federations, and trade associations. SME networks generally differ from these forms along three identifiable dimensions: purpose, interdependence, and membership criteria. First, these networks are generally

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created to provide a forum for direct, even joint, business activities among multiple network members, in addition to indirect member services. For instance, Florida's TeCMEN network has linked over 30 firms for joint product development, many of which were competitors in that state's electronics industry. The members remain independent yet work directly together for mutual objectives. In contrast, the primary purpose of trade associations and federations is most often to provide indirect services for their participating firms (e.g., lobbying, promotion). Joint ventures typically pursue the objectives of two organizations through creation of a separately managed venture, but SME networks pursue organizational objectives through coordinated interactions of perhaps 10, 20, or more individual firms, collectively comprising an interorganizational network.

Second, recent U.S. small-to-medium-sized-enterprise networks promote complex, reciprocal interdependencies (Thompson, 1967) in which members provide inputs and receive outputs from each other. Interdependencies are usually coordinated by the network firms themselves and a network-level coordinator or administrative organization. A major goal of this coordinating structure is to facilitate interaction among network member firms. Practitioners have identified network firm interdependencies ranging from "jointly developing solutions to common problems" to "jointly manufacturing components, assemblies, or finished goods" (Bosworth, 1995: 2). In contrast, federations and joint ventures typically engage in pooled interdependencies (Thompson, 1967) coordinated through administrative structures designed to manage, in standardized ways, the pooled activities of member firms. One network promoter differentiated networks from trade associations, stating that the latter should change their mission and "develop real services and do more to facilitate interactions among members" (Coffey, 1995: 1).

Third, SME network membership criteria emphasize geographically proximate core competencies among member firms that combine to allow the firms to accomplish specific organizational objectives that no one member could have accomplished individually. Members of the Kentucky Wood Manufacturers' Network are required to have "production facilities located in the state" so that members can work on joint production projects (Lichtenstein, 1992: 32). In contrast, joint ventures often combine core competencies in large-firm dyadic linkages that are not necessarily geographically proximate. Trade associations commonly focus on industry participation rather than on developing organizations' competencies.

Although small firms may benefit substantially from network involvement, much of the research on networks has been on large-firm strategic alliances or on nonprofit networks, with some exceptions. For instance, Inzerilli (1990) used a transaction cost perspective to describe how a trust-based social context reduced opportunism and facilitated success among small firms in northern Italian industrial districts. Brusco and Righi (1989) and Lorenzoni and Ornati (1988) confirmed the importance of environmental factors for small firm growth through networks. Saxenian (1994) de-

scribed the emergence of infrastructures in the United States to support European-style cooperative systems. These studies helped provide a descriptive foundation for our project while suggesting a link between network structures and outcomes. For instance, Saxenian (1990: 105) described how the lack of "administrative coordination" in California's Silicon Valley, "an American variant of the industrial districts of Europe (1990: 91), made the Valley's networks more vulnerable to environmental changes over time. Lorenzoni and Ornati (1988) argued that exchange structures within constellations of complementary firms influenced organizational growth.

Despite some work on the topic, the relationship between key aspects of network structure and organizational outcomes has often been assumed, rather than studied directly, or studied only regarding one type of outcome. Broader organizational theory, like transaction cost economics (Williamson, 1985) and resource dependence (Pfeffer & Salancik, 1978) has often been used to explain aspects of networks, such as governance or interorganizational power and resource acquisition, but these theories focus primarily on interorganizational relations, not networks. Thus, what is known about which network structures work best and what kinds of outcomes might be expected from network membership is quite limited, especially in an SME context. Because of the lack of adequate theory to guide research on small-to-medium-sized-enterprise networks or to advance network practice in this important and emerging area, we decided to undertake a study to explore the structure of U.S. small-to-medium-sized-enterprise networks and the outcomes member firms obtained from network participation.

RESEARCH QUESTIONS

We organized our research around three questions. The first question was, What outcomes do firms achieve from network participation? As mentioned above, most case studies on small-to-medium-sized-enterprise networks have either examined why and how networks have emerged among small or new private-sector firms or have examined the relevance of the network strategy for regional economic growth, focusing on a single type of organizational outcome or on aggregate outcomes such as regional employment growth. Past research on network outcomes has also tended to focus heavily on profits and performance (Smith, Carroll, & Ashford, 1995). Although objective measures of profit can sometimes be used with success (Shortell & Zajac, 1988), small firms often do not have the information systems needed to collect reliable outcome data (Dess & Robinson, 1984). Further, financial benefits either may not accrue to small and medium-sized firms using cooperative strategies (Baird, Lyles, & Orris, 1992), or they may lag network formation by several years. We examined both financial and nonfinancial, or process, consequences (Baird, Lyles, & Reger, 1993) of network involvement, first to address the fundamental question of whether small and midsize manufacturers benefit from network involvement, and second, to learn which types of outcomes are most likely to occur.

Our second research question was, Do SME network firms and their outcomes differ in discernible ways from their market counterparts and their outcomes? If the aim of extending research on interorganizational relations is to explore outcomes of network participation, then it is useful to compare networks with the alternative mode for organizing, market arrangements (Jarillo, 1988), thereby highlighting potential network-market differences. Comparative research has primarily examined network and market approaches as sets of loosely connected activities, in which researchers list separate cooperative and competitive strategies, then ask respondents to indicate the frequency and extensiveness of their use of each activity (Baird et al., 1992; Brush & Chaganti, 1993). Although these studies provide useful comparisons of specific competitive and cooperative strategies across companies, they do not address whether a set of market firms can derive benefits similar to those network firms derive through nonnetwork interorganizational linking mechanisms. This is an important question since it underlies the basic rationale for SME network formation.

Our third research question was, How are small-to-medium-sized-enterprise networks structured, and to what extent can structural differences explain organizational outcomes resulting from network participation? Despite the fact that sociologists and organizational researchers have examined network structure for well over two decades (see reviews by Marsden [1990], Nohria and Eccles [1992], and Wasserman and Galaskiewicz [1994]), structure has mostly either been the dependent variable or has been used to predict outcomes related to power and influence within a network (Boje & Whetten, 1981; Cook, 1977; Cook & Yamagishi, 1992). Researchers have also used structural properties of organizational relationships to explain other outcomes, including performance (Galaskiewicz & Marsden, 1978; Shortell & Zajac, 1988; Stearns, Hoffman, & Heide, 1987), but their focus has mostly been on dyadic links rather than on multifirm networks, and the context has mostly been health and human services (Provan & Milward, 1995). Further, studies of network structure among profit-making firms have often focused on one or a few interfirm relationships, such as interlocking directorates, rather than capturing multiple ties among organizations (Barley, Freeman, & Hybels, 1992). As a result, there is little understanding of small-to-medium-sized-enterprise network structure and whether different structural forms facilitate or inhibit the attainment of desired network outcomes. Particularly at this early stage in SME network evolution in the United States, this information is critical for network planners and organizers trying to establish a credible alternative to traditional market-based, competitive relationships.

METHODS

Because there is so little comparative empirical research on SME networks and because the research on other types of networks has limited generalizability to a small-to-medium-sized-enterprise context, we chose

to conduct an inductive study. In keeping with an inductive case study approach (Eisenhardt, 1989), our project did not start from a particular theoretical perspective. Rather, our goal was to build theory from an in-depth examination of two small-to-medium-sized-enterprise networks and a matched set of market firms. Guided by relevant gaps in the literature, we first identified our general research questions and the related constructs, network structure and organizational outcomes. Next, we collected and analyzed data using an exploratory (Hartwig & Dearing, 1979) rather than a confirmatory hypothesis-testing approach; thus, we identified patterns in the data, then returned to the literature for conceptual clarification of those patterns. Finally, we developed propositions from our findings. We adopted Jarillo's (1988) framework, in which strategic networks are contrasted to markets, to describe interorganizational relationships among independent organizations, and we adopted his broad definition of strategic networks as "long-term, purposeful arrangements among distinct but related for-profit organizations that allow those firms in them to gain or sustain competitive advantage . . . [while remaining] independent along some dimensions" (Jarillo, 1988: 32).

We narrowed our definition of networks still further, in view of the goals of our research and how our informants defined them. The definition that emerged was that networks are intentionally formed groups of small- and medium-sized profit-oriented companies in which the firms (1) are geographically proximate, (2) operate within the same industry, potentially sharing inputs and outputs, and (3) undertake direct interactions with each other for specific business outcomes (Bosworth & Rosenfeld, 1992). These interactions may include joint production, new product development, collective marketing, and employee training.[1] To examine small-and-medium-sized enterprises' involvement in multifirm networks, we adopted an organization-level perspective regarding outcomes that is consistent with the major goal of these networks, to improve member firm competitiveness (Lichtenstein, 1992).

Because this article reports a qualitative inductive study, its format differs somewhat from the formats generally used in reporting quantitative research. Our description of the research methods includes an account of the iterative data collection and analysis process appropriate for exploratory research on new phenomena (Eisenhardt, 1989). The results of our exploratory research, which address our research questions, are presented in the

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[1] There are many definitions of networks (Nohria & Eccles, 1992). Our definition (1) captures the meaning of networks common in the small-to-medium-sized-enterprise practitioner literature and among our respondents, (2) focuses on empirically observable activities, and (3) distinguishes networks from related organizational forms such as trade associations. A national newsletter promoting network development stated this: "Only the exceptional trade association brings businesses face-to-face for purposes of developing trust or cutting business deals. Most are collective voices to influence governments, not collective production systems to capture markets" (Coffey, 1995: 6).

next section. We attempted to build theory from our findings by developing testable propositions and an overall model. The final section discusses implications and conclusions for research and practice.

Table 1 provides an overview of our three-phase research process. After an initial groundwork phase, we used a two-stage cross-sectional design following Eisenhardt's (1989) suggested sequence for exploratory, theory-building research and Jick's (1979) "triangulation" research strategy, in which we integrated qualitative and quantitative evidence. Consistent with the goals for exploratory research, the study incorporated a replication rather than a sampling logic (Yin, 1989). That is, instead of examining the frequency of network structures and outcomes for statistical inference to a network population, we viewed network and market firms as multiple cases in which the unfolding evidence should either be similar or different across firms. Thus, our goal was theory building rather than theory testing. Data, collected during 1994 and 1995, were obtained through multiple sources, including interviews, questionnaires, on-site tours of network firm operations, and archival documents (network grant reports, newsletters, articles). Qualitative interviews conducted prior to survey development helped ensure construct and item applicability for respondents and provided insights for interpreting survey results.

Groundwork Phase

During the groundwork phase (1993–94), we developed our research questions, design, and samples (Table 1). During this time, one of the researchers observed network meetings for two networks (one of which participated in this study) and participated for a year on a task force charged with small-to-medium-sized-enterprise network development. Following Yin's (1989) suggestions for within- and across-case comparisons in qualitative research, we selected two same-industry networks with similar purposes, formation periods, and membership sizes for study and then selected same-industry market firms located in either of the two states the networks operated in. The setting for this study, the secondary wood products industry, is one of the "suffering industrial sectors" (Bosworth & Rosenfeld, 1992: 29) targeted by the U.S. economic development community for network creation over the past decade. The industry, composed of firms that produce finished and semifinished wood products like cabinets and furniture, has a large proportion of small and medium-sized firms that could potentially gain strategic advantage from network involvement.

Our sampling frame, *A Catalogue of U.S. Manufacturing Networks* (Lichtenstein, 1992), documented the formation of 27 small-to-medium-sized-enterprise networks between 1989 and 1991, primarily in the wood products, metal working, and apparel industries. We wanted to find 2 networks for comparative study. Our criterion for inclusion in the sample was that a network have ongoing activity and interaction among separately located members. Through use of this criterion, we avoided networks that existed in name only or for a single event, or whose member firms were located in one

TABLE 1
Overview of the Research Process[a]

Research Element	Groundwork Phase		Stage One: Qualitative Phase	Stage Two: Quantitative Phase
	Research Design	Sample Selection	Interviews	Questionnaires
Focus	To identify research questions and appropriate design	To select networks, network firms, and market firms	To explore network structure and firm-level outcomes. To compare interorganizational relationship activity across network and market firms	To triangulate qualitative outcome data and collect comparative quantitative data on basis of themes identified during interviews for comparison of network structure and firm-level outcomes
Data sources	Organization and practitioner literature, preliminary interviews, task force participation, network meeting observation	Networks: National directory; Network firms: Network membership directories; Market firms: State manufacturing directories	Networks: One- to two-hour interviews; Network firms: One- to two-hour interviews; Market firms: 30-minute to one-hour interviews	Questionnaire. Telephone discussions prior to mailing questionnaire to obtain commitment and after mailing to clarify items
Sample and respondents		Networks: Active same-industry networks with comparable membership size and purposes; Network firms: Reputational sample of member firms selected on basis of their network activity and participation; Market firms: Random sample of nonnetwork firms in same industry and with products and locations similar to network firms'	Networks: Two executive directors; Network firms: CEO-owners or top managers of 10 firms from sample; Market firms: CEO-owners or top managers of 10 firms	Network firms: CEO-owners or top managers of complete sample

TABLE 1 (continued)

Research Element	Groundwork Phase		Stage One: Qualitative Phase	Stage Two: Quantitative Phase
	Research Design	Sample Selection	Interviews	Questionnaires
Data analysis			Constant comparison approach after each interview. Thematic coding of qualitative data using enfolding literature	Network structure: Network analyses and plotting. Firm-level outcomes: Descriptive statistics, qualitative factoring
Results	Selected two-stage exploratory, comparative design. Identified primary research constructs: network structure and firm-level outcomes	Selected two networks in wood products industry in two states. Network directors nominated reputational samples of network firms from their complete network membership directories for interviews and questionnaires. Selected 10 market firms and 10 network firms for interviews	Identified major themes for comparing network structures (e.g., administrative and interactive structure) and outcomes (e.g., interorganizational exchanges, organizational credibility, access to resources). Confirmed that market firms do not use interorganizational relationships as network firms use them	Developed preliminary propositions regarding network structure and firm-level outcomes from interview and questionnaire data

ª The "results" of the groundwork phase led to the "focus" of stage one; the "results" of stage one led to the "focus" of stage two.

building. Preliminary interviews with network planners, administrators, and member firms in 5 of the listed wood products networks produced 2 that met our criterion. We labeled these 2 networks "alpha-net" and "beta-net." Total manufacturing company membership listed in the directories of the 2 selected networks equaled 60 and 77 firms respectively (institutional members like universities were excluded). One network operated in a southern and 1 in a northern state. Table 2 provides descriptions of both networks.

After careful consideration, we decided that it made little sense to collect data from all firms in each network, since many firms were members in name only and had little involvement with network administration or other members. Conversations with network administrators indicated that member firms cited multiple reasons for their network inactivity, including "lack of time," "lack of trust," "inconvenient meeting locations," and "difficulty getting away from the business." Respondents from inactive firms would have had great difficulty answering our questions and would have added little value to our overall understanding of network activities and structure

TABLE 2
Network Descriptive Characteristics

Characteristic	Alpha-net	Beta-net
Year formed	1989	1990
Structure	Network administrative organization: Nonprofit organization composed of part-time executive director, one part-time staffer, 13-member board of directors Network membership: 60 manufacturing companies, 9 associate members (e.g., educational and economic development agencies)	Network administrative organization: Nonprofit organization composed of full-time executive director, three full-time staffers, 13-member board of directors Network membership: 77 manufacturing companies, 9 associate members (e.g., educational and economic development agencies)
Objectives	Joint marketing, production, and development for secondary wood products firms in the state, focusing on furniture manufacturers	Joint marketing, production, and development for secondary wood products firms, focusing on a multicounty region of the state
Member services provided	Individual: Consulting, business planning, technical assistance, market research Group: Monthly membership and board meetings, monthly newsletter, training workshops, demonstration projects, trade shows, catalog, insurance program, business and information brokering, video library, showroom	Individual: Consulting, business planning, technical assistance, market research Group: Quarterly board meetings and newsletters, annual membership meetings, trade shows, catalogs, business and information brokering, site tours, technology transfer project

since these firms were, for all practical purposes, not part of the focal net-
works. Thus, guided by our basic theoretical concerns, we selected a sample
of firms within each network. We used a reputational sampling technique
(Laumann, Marsden, & Prensky, 1983; Scott, 1991) that better allowed us to
address our research questions than either random or snowball sampling (cf.
Scott, 1991). Random sampling is based on the assumption that all potential
respondents in a population are "equally important" for addressing research
questions (Holsti, 1968: 654), yet our initial network selection experience
demonstrated that not all network members could equally address our re-
search objectives. Snowball sampling builds on the connections of specified
respondents, asking initial respondents to name network members with
which they interact, then asking named members for their connections; this
process creates an interconnected sample by definition. In contrast, asking a
key network informant to select a sample of firms based on their reputations
as active and participating in the network ensured that the sample firms
could address the project's outcome questions, while allowing interfirm con-
nections to emerge rather than be predefined.

The executive directors for the two network administrative organiza-
tions, who were actively involved in forming and maintaining their respec-
tive networks, were our key informants for sample selection. All selected
firms had to have been network members for at least one year. After we had
described the purpose of the study, the research questions, and our criteria
for sample selection to the directors, they selected 22 firms that were active
in alpha-net and 23 in beta-net based on detailed searches of their member-
ship lists. These reputational samples represented 37 percent of alpha-net's
and 30 percent of beta-net's total memberships (i.e., 22 of 60 firms and 23 of
77 firms, respectively) and were consistent with estimates that active mem-
bers often represent only 25 to 30 percent of total network membership
(Lichtenstein, 1992). We then randomly selected 10 network firms (5 from
each reputational sample) to participate in the in-depth interviews that
would comprise stage one. Finally, 10 market firms listed in manufacturing
directories from the two network states (5 from each state) were randomly
selected to participate in the first-stage interviews. The 10 market firms
represented product lines and sizes that were similar to the network firms'
in their respective states and were only selected if they were geographically
close enough to the appropriate network administrative organization (i.e.,
within 100 miles) that distance was not a reason they were not in the net-
work. Table 3 provides descriptive characteristics of all respondent firms.

Stage One: Qualitative Data Collection

During stage one, we collected and analyzed qualitative data from ex-
ploratory interviews of network and market firms to provide the explana-
tions necessary for understanding a new phenomenon and to identify major
themes for the second-stage questionnaire. After pretesting interview proto-
cols with network firms not included in our study, we conducted one- to
two-hour interviews (in person or by telephone) with the two network ad-

TABLE 3
Respondent and Firm Characteristics

Characteristics	Alpha-net[a]	Beta-net[b]	Market Firms[c]
Respondent position	17 CEO-owners	20 CEO-owners	7 CEO-owners
	2 top managers	3 top managers	3 top managers
Mean number of years in position	11.9	11.2	13.5
Mean number of hours per month			
on network activities[d]	7	5	0.50
Mean firm size			
Employees	14	26	24
Gross sales[e]	550	3,300	2,000
Range of firm sizes			
Employees	1–120	1–125	3–150
Gross sales[e]	60–2,600	10–20,000	100–12,000
Mean firm age in years	13	15	23
Number primary product lines			
represented	4	12	4
Mean number of years in network[f]	3.74 (6)	2.57 (5)	
Mean number of miles to			
network administrative organization	76	42	54

[a] Three nonrespondents not included; $N = 19$.
[b] Includes complete sample; $N = 23$.
[c] $N = 10$.
[d] For market firms, mean hours on professional organization activities.
[e] In thousands of dollars.
[f] Numbers in parentheses show the maximum possible.

ministrators and with the CEO-owners or the top managers of the 10 previously chosen network firms. Our interview protocols provided a framework for exploring network outcomes and structures while allowing us to pursue other issues seen as important by respondents. Market firm protocols were then developed and interviews conducted with their CEO-owners or top managers to compare their market-based interorganizational relationships with the network firms' relationships.

Consistent with a replication logic, data analysis, coding, and conceptual categorization occurred after each interview in stage one. Systematic procedures for qualitative data collection and analysis included transcribing interview notes shortly after each interview, creating field notes to describe processes and impressions, and identifying thematic patterns in respondent comments (Glaser & Strauss, 1967; Miles & Huberman, 1994; Yin, 1989). After identifying patterns in the qualitative evidence, we followed Eisenhardt's (1989) suggestion and returned to "enfolding" literatures for triangulation and conceptual clarification of the patterns. For instance, we consulted both practitioner research (Rosenfeld, 1993) and the organizational literature (Venkatraman & Ramanujam, 1986, 1987) to clarify emergent outcome findings. As Table 1 indicates, exploratory interviews identified major themes for comparisons; these included network structures (administrative and interactive) and network outcomes, such as four types of interorganiza-

tional exchanges—business, friendship, information, and competencies. Interviews also confirmed network and market differences. Our findings are presented in a later section.

Stage Two: Quantitative Data Collection

In stage two, we administered a questionnaire to the full samples of firms in both networks to explore and validate data patterns uncovered in stage one and to collect quantitative data more accessible through questionnaires than interviews. Like previous qualitative researchers (e.g., Eisenhardt & Bourgeois, 1988), we thought that results would be strengthened if we provided quantitative measures that could be readily compared across organizations and networks. We built second-stage questions around first-stage interview results to ensure that network structure and outcome measures were appropriate for the networks being studied. After pretesting the initial questionnaire in a third, unsampled wood industry network and in 1 firm from each of our selected networks (to ensure item applicability), we contacted each network respondent by phone to obtain agreement to participate.

Using our questionnaire, we collected data on firm characteristics as well as sociometric, or network structure, data. These structural data were obtained by asking respondents to indicate with which other sample firms they had had business, friendship, information, and competency exchanges over the past year. We identified these four types of exchange from the stage one interviews. Interrater reliability was achieved by using only those exchanges that were confirmed by each partner in a given link (see the Appendix). Consistent with our use of reputational sampling, we did not ask survey respondents to indicate their exchanges with all firms listed in their network membership rosters (60 firms in alpha-net and 77 in beta-net). Our survey pretesting determined that time-intensive sociometric questions for such extensive membership lists would greatly decrease response rates and accuracy while generating data on firms that had little or no network involvement. For comparing outcome data, we asked respondents to indicate, from a 26-item list generated from our exploratory interviews, which outcomes had occurred as a result of their network participation. We received completed surveys from 19 of the 22 firms in the alpha-net sample (86%) and from all 23 firms in the beta-net sample.

Descriptive statistics were used to capture questionnaire data on organizational and individual attributes such as major product line, firm size, outcomes, and respondent position. We then applied network analysis techniques using UCINET (Borgatti, Everett, & Freeman, 1992) and KrackPlot (Krackhardt, Lundberg, & O'Rourke, 1993) software to analyze the sociometric questionnaire data (the Appendix describes our network analysis measures). Researchers generally caution against using network analysis on incomplete network data (Knoke & Kuklinski, 1982). However, boundary specification is seldom obvious (Laumann et al., 1983), and much of the extant network research could be criticized for either over- or underinclu-

sion. We considered our procedure for network inclusion appropriate and excluded firms that were members in name only. Nonetheless, we acknowledge cautions concerning missing data in network research and recognize that our findings do not necessarily represent relationships and outcomes for all firms listed in each complete network.

We adopted a contrast-comparison approach (Miles & Huberman, 1994) for analyzing and generating meaning from the questionnaire data. That is, we searched for data patterns that revealed juxtaposing or contrasting structure and outcome characteristics within cases (i.e., network-network) and across cases (i.e., network-market). For instance, we compared descriptive statistics on the major product lines of member firms, examining domain similarity (Van de Ven & Ferry, 1980) across networks. In addition, we compared common network structural measures, such as local centrality and graph density, to uncover differences in the number of highly central firms in alpha-net and beta-net. Finally, we used a qualitative factoring procedure suggested by Miles and Huberman (1994) to analyze outcome data.

NETWORK PARTICIPATION AND ORGANIZATIONAL OUTCOMES

Our first research question concerns what outcomes firms achieve from network participation. The evidence revealed multiple outcomes, both economic and noneconomic. Further, addressing our second research question, the findings confirmed that these outcomes went beyond those available to firms in traditional market relationships, supporting the value of small-to-medium-sized-enterprise networks to involved member firms.

Outcomes in Small-to-Medium-Sized-Enterprise Networks

During interviews, we asked network respondents to describe what their firms had achieved from network participation. Comments ranged from financial performance outcomes ("We joined three years ago to expand our sales of products. Last year our business expanded from a little over $2 million to well over $3 million") to outcomes that were clearly process oriented ("I have learned about different ways of running the business that I would have never thought of"). Although some short-term outcomes were mentioned, most responses could be categorized as concerning an indirect or long-range impact on performance, reflecting the long-term orientation of network involvement discussed by Jarillo (1988), Powell (1990), Larson (1992), and others. We identified four main categories of outcomes from the network interviews: interorganizational exchanges, organizational credibility, access to resources, and financial performance. Table 4 presents qualitative findings illustrating these categories.

Interorganizational exchanges. The first outcome category, interorganizational exchanges, refers to direct transactions or exchanges among network firms, such as buying and selling, jointly producing and marketing a product, and exchanging friendship and information with each other. For instance, interview respondents indicated that although they had buyer-

TABLE 4
Outcomes of Network Participation: Interview Results

Outcomes	Representative Alpha-net Comments	Representative Beta-net Comments
Interorganizational exchanges		
Business	I met another furniture maker at the meetings. We found we had similar ideas so we came up with a new product we could both work on. We designed it so he makes the tops and I make the bottoms and assemble it. Then we both market and sell the products as well as show them in the [alpha-net] gallery.	I now sell my downfall [waste wood] to other smaller members . . . instead of destroying it.
Information	I have found out about all kinds of new . . . techniques for doing what I do. I can call any of the folks I've met through [alpha-net] and ask them questions I couldn't ask anybody else.	It's not so threatening for me to call up [another furniture maker] and ask how he handles a type of job similar to mine that I know he's had . . . so we share information.
Friendship	There's a friendlier environment in working with [alpha-net] members. We know each other and trust each other basically.	There's a certain amount of . . . easygoing friendship with [beta-net] members, as opposed to "do I want to do this, or are you going to cut my throat" kind of attitude.
Competencies	The ability to share the stronger points in the different shops and the way they're organized has been a major benefit to me. We combine the best of several different shops.	Another member and myself differed so much on how we approached things . . . but . . . he's good at some things that I'm not, and vice versa . . . so that difference made it feasible for him to give me things he's not set up to do and he can help me on things I don't do so well.

TABLE 4 (continued)

Outcomes	Representative Alpha-net Comments	Representative Beta-net Comments
Organizational credibility	Mostly the benefits from [alpha-net] come from their ability to talk with the state, which personally I could not do. We [alpha-net] established a relationship with the university forest products laboratory . . . which as small shops we could not do individually.	The amount of PR that [beta-net] was getting . . . it's been such a high-visibility organization from the beginning. By joining, I could be a part of that visibility, that PR, . . . and look more legitimate as a small company.
Access to resources	The promotion through the catalog and the trade shows . . . has led to radio and TV spots with no cost to me.	They [beta-net staff] researched for us . . . and came back saying "here are the people you can contact on this . . . here is a bank that shows willingness to be involved in the wood industry."
Financial performance	We have some members who have grown their business from a small company to a medium-size company due to [alpha-net]. Like we did. We tripled our business, and seriously improved our bottom line, since we started with [alpha-net]. So it's done a pretty good job for us.	We joined three years ago to expand our sales of products. Last year our business expanded from a little over \$2 million to well over \$3 million, due a lot to our new contacts through [beta-net].

seller relationships with member firms and nonmember firms, they often knew "what members can do . . . better than those outside [the network]." Respondents from both networks also described joint business projects with member firms. For instance, an alpha-net member stated this: "A couple of us that met through [alpha-net] decided our products looked good together so we had a joint show at the showroom. We sent mailings to both of our mailing lists and, after some debate, shared our lists so we would know if we had many overlaps. [The alpha-net director] advertised it for us as well . . . and we were pleased with the turnout." A beta-net respondent described marketing his products through a beta-net catalog project: "[Beta-net] came up with the money for a color catalog to market members' products. At first we felt funny about being in a catalog with some competitors, since our products were featured even on the same pages as competitors'! But we stayed with the project and got some orders out of it." Respondents, particularly from alpha-net, also made it clear that the exchanges they described did not occur prior to network participation and that their initial expectations were rather modest. As one alpha-net CEO commented, "There was a certain level of fear that existed in me, that the network could be a negative thing. But it was just a click of good ideas and sharing information, and people saying 'How you do that?' or 'Where do I get that?' " Overall, although exchanges did not occur equally among respondent firms, the qualitative evidence indicated clearly that network membership provided a group of known firms with which members could and frequently did safely engage in business, information, friendship, and competency exchanges.

Organizational credibility. The second category of outcomes uncovered from our interviews, organizational credibility, refers to respondents' perceptions that firm external legitimacy was enhanced through association with the network. For instance, the network administrative organization, in both cases a nonprofit organization, established relationships with local universities, large suppliers, and state agencies that smaller, individual firms could not establish. In one example, the state agency representing the wood products industry had no current database of manufacturing firms in the state. Respondents described how alpha-net "established an industry presence" that generated state interest in updating the database and provided a mechanism individual firms could use to show state decision makers "what we have got." In a second example, beta-net's director arranged for a large supplier to demonstrate new manufacturing technologies to network member firms. Respondents indicated that previous attempts to obtain this information made by the small firms independently had been unsuccessful because of "lack of company importance . . . these suppliers see us as unimportant players in the market . . . but when we contact them as a network they see us differently." Thus, network respondents perceived that network participation increased the visibility and credibility of member firms.

Access to resources. The third category of outcomes identified, access to resources, refers to how network participation played an instrumental role in respondents' accessing new markets, new product ideas, and other valued

resources for their companies. For instance, respondents described how, through network participation, they had been "introduced to a completely new line of business," had "established contact with banks that lend to the wood industry," and were "lined up with local and even national business contacts."

Financial performance. Finally, respondents reported financial performance outcomes in the interviews. Some respondents described economic benefits that had occurred within a short time after joining the network: "As a result of what's gone on with the connections I've made through [alpha-net], and the company growth I've experienced, I've just bought the ten acres in front of me so I can expand my operation." Other respondents described a longer-term perspective on economic benefits: "I don't think that the main emphasis of [beta-net] should be to bring someone's bottom line up immediately. I think we should focus on ways to improve techniques, regardless of how you are doing things now, and the bottom line will naturally come up." In sum, the interview data provided ample evidence that network participation benefited member firms across a range of financial and noneconomic issues and that trust and long-term commitment pervaded network thinking.

Outcome items. Drawing on the interview results, we then developed a list of 26 potential firm outcomes resulting from network participation. This list was included as part of the questionnaire completed by the full sample of respondents in both networks. Table 5 presents the list of organizational outcomes and the percentages of respondents in each network who reported that a particular outcome had occurred. Overall, although outcomes were not always achieved immediately, firms in both networks reported positive results, supporting the interview findings. Outcomes were not equally strong in both networks, however. On average, alpha-net respondents reported 60.77 percent of the outcomes as having occurred, and beta-net respondents reported achieving only 48.38 percent of the same outcomes. This difference is statistically significant at the .05 level on the basis of a t-test comparison of means.

Obviously, our results would have been strengthened if we had had access to objective data on outcomes. However, we can conclude with reasonable confidence that over the broad range of outcomes respondents from both networks reported as important, alpha-net members perceived network participation as being more positive than did the members of beta-net. Beta-net firms did report positive outcomes as a result of network membership, particularly in certain categories. For instance, 83 percent reported they were able to "generate new ideas for products or processes" as a result of network affiliation. Nonetheless, across the full range of outcomes, beta-net did not appear to benefit its members as much as alpha-net did.

Next, we analyzed these data using a qualitative factoring procedure designed to identify "thematic commonalities" to reduce the list of 26 items to a smaller subset of conceptually sorted outcome categories, or "factors" (Miles & Huberman, 1994: 257). After identifying preliminary conceptual

TABLE 5
Frequency of Reports of Firm Outcomes Resulting from Network Participation

Outcome	Outcome Type[a]	Alpha-net	Beta-net
Improved my firm's financial performance (e.g., sales, profitability, ROI]	a	42%	52%
Improved my firm's operational performance (e.g., product quality, new product introductions)	a	43	56
Generated new ideas for products or processes	a	79	83
Improved my management skills	f	48	48
Changed the way I organized work or people	f	42	30
Added personnel to my business	a	32	39
Accessed new equipment or production processes	a	63	43
Accessed new techniques or skills	a	74	48
Accessed new contacts or suppliers	a	89	74
Accessed new markets for my business	a	74	61
Jointly marketed products or services with network member firms	f	52	48
Jointly designed or developed new products with network member firms	f	42	26
Jointly bid on projects with network member firms	f	37	39
Jointly produced a product or service with network member firms	f	42	26
Shared specialty services or technologies with network member firms	f	79	52
Discussed common problems with network member firms	f	95	70
Increased my interactions with competitors within network membership	f	79	43
Viewed competitors as potential resources for my business	f	84	43
Became a customer of network member firms	f	42	52
Became a supplier to network member firms	f	58	56
Referred jobs to network member firms	f	89	61
Subcontracted jobs with network member firms	f	26	30
Clarified my understanding of my firm's competitive capabilities	f	74	39
Gained "trade secrets" from competitors in the network membership[b]	—	37	13
"Bought into" or accepted concept of cooperation among firms (even competitors) through a network	f	74	61
Increased my firm's credibility through association with the network	a	84	65
Mean for all outcomes[c]		60.77*	48.38
Mean for transactional outcomes[c]		64.44	57.89
Mean for transformational outcomes[c]		60.19**	45.25

[a] An "a" denotes a transactional outcome, such as enhanced resource acquisition or performance gains. An "f" denotes a transformational outcome, or a change in the ways the network firms' CEO-owners or top managers think and act. There are 9 transactional items and 16 transformational items.

[b] Item dropped from conceptual factor analysis.

factors, we searched the organizations literature for conceptual clarification of these categories and finally returned to our outcome data to verify the fit between the data and our emerging factors. We continued this process until we determined that our enfolding literature (Eisenhardt, 1989) did indeed improve our understanding of the outcome data and provided support for our conceptual categorization.

   Transactional and transformational outcomes. The qualitative factoring and enfolding literature procedures revealed a strong conceptual fit with Beije and Groenewegen's (1992) categorization of transactional and transformational network activities and outcomes. *Transactional outcomes* are enhanced resource acquisition or gains in performance. A beta-net respondent's statement that network participation "opened my eyes to other markets" is an example. We identified 9 such outcome items; Table 5 identifies these items. *Transformational outcomes* are changes in the ways the managers of network firms think, act, or both. For instance, an alpha-net respondent described how network participation changed his approach to working with competitors: "Without [alpha-net], I would say 'I don't want to divulge any of my secrets . . . these guys are my competition,' but there's a lot of things that these other guys know a lot more about than I do . . . so that has made [joining the network] worth it." A beta-net respondent described "a joint bid I won with another member that led me in a whole new direction. That [joint bidding] is not something I would've done without [beta-net]." We identified 16 transformational outcomes. One item (the third-to-the-last item in Table 5) was dropped from the qualitative factor analysis because it was listed so infrequently by network members (only 13 percent of beta-net firms) and because it involved using the network in ways that we viewed as being potentially damaging to network viability.

   Results from this second stage of analysis of outcome data revealed some interesting findings. It was clear that firms in both networks did see benefits from their participation in the network, but alpha-net firms found their involvement to be advantageous regarding both transactional (64.44%) and transformational (60.19%) outcomes. In contrast, beta-net firms appeared to achieve more transactional (57.89%) than transformational outcomes (45.25%). Beta-net firms thus appeared to view their network as an extension of traditional market relationships and were less inclined to seek full benefits of network membership, which would have required more direct interaction and sharing with other network members. Comparing results across networks, the reported occurrence of transformational outcomes was significantly higher among alpha-net firms than among beta-net firms ($p < .02$), and there was no significant difference between the two networks for transactional outcomes.

   To summarize, our findings on outcomes indicate that member firms appear to achieve substantial benefits from network involvement. Powell (1990), Jarillo (1988), Saxenian (1994), and others have argued strongly that networks are worthwhile despite their costs. Our work supports this view but also goes further, indicating that both transactional and transformational

outcomes of network involvement occur. Although firms in both small-to-medium-sized-enterprise networks studied reported favorable outcomes in the interviews, the survey data indicated that, at least for transformational outcomes, alpha-net firms benefited more. Our findings on outcomes are stated as a formal proposition. Below, we explore in depth the details of what network characteristics might be related to differences in outcomes, in the section addressing the research question on network structure.

> *Proposition 1. Firms in small-to-medium-sized-enterprise strategic networks are likely to achieve a broad range of favorable transactional and transformational outcomes as a result of their network involvement. Transactional outcomes are most likely to be consistent across SME networks, whereas transformational outcomes are likely to vary across networks.*

Network–Market Firm Comparison

The second question that guided our research was whether outcomes for firms in SME networks differ from outcomes for firms that are not network members, or market firms. In particular, we were interested in discovering if nonnetwork firms pursued ongoing interorganizational relationships within traditional market arrangements that enabled them to achieve the same types of outcomes as network firms. Table 6 presents findings from our interviews with the sample of 10 comparable market firms. The evidence indicates that the exchanges, organizational credibility, and access to resources available to firms through the networks were not pursued through interorganizational relationships by market firms. The market respondents indicated little or no interest in developing ongoing interorganizational exchanges with competitors, viewed organizational credibility as an issue for other firms, and rarely if ever used competitors or other similar firms in their industry to access organizational resources. We could not accurately determine whether financial performance was stronger for network or nonnetwork firms, although the interviews made it clear that market firms achieved financial performance through independent and competitive activities rather than through cooperation with other firms.

Market respondents who interacted with competitors often did so "by chance" or by "running into someone" at a supplier or trade show. Thus, both network and market firms utilized contacts such as personal and business relationships, but only network firms interacted regularly with competitors and other, similar firms in their industry. Overall, our comparison of network and market firms indicated that network membership provided an external structure beyond market mechanisms through which network firms generated new interorganizational exchanges, expanded organizational legitimacy, and accessed organizational resources. This finding clearly supports the view held by Powell (1990), Larson (1992), and Provan (1993), that networks are a unique organizational form and not simply an interorganiza-

TABLE 6
Attitudes toward Cooperation among Competitors: Market Evidence

Cooperation Outcomes	Representative Market Company Responses	Summary
Interorganizational exchanges		
Referrals	I am glad to refer, except in my line of business. I never do it then.	
Friendship	I am friendly with all my customers . . . for one thing, I like to pick their brains and get ideas on new sources . . . but I am not friendly with competitors.	
Resources	I use competitors as resources . . . when I am in a crunch.	
	No, I never use competitors as resources . . . for one thing, you can't make any money with the markup you have to add to their product.	Few interorganization exchanges.
Expanded credibility	I think joining [an association to improve firm credibility] is more for the companies that are high-volume and new-product-oriented.	Low use of cooperation to expand credibility;
	I think using a network for increasing credibility would be mainly for the craft industry.	practice seen as relevant to other firms.
Access to resources		
New technologies	Mostly from salesmen. They work the whole state, so they get to know what others are doing, and pass it on . . . we get ideas that way.	
	New suppliers will find us at trade shows.	
New product ideas	Some product ideas come from customers . . . some from architect designs . . . we work off drawings and improve on them, we build in our techniques.	
Competitors' capabilities	We learn about the capabilities of the firms through the media . . . stories and articles about what so and so is doing.	
Importance of external links for accessing resources	I probably know 90 percent of what I need to know, and am connected to everyone my business needs . . . I don't feel the need for [association membership] anymore.	
	We are very busy . . . so the problem is when do you find the time to join or participate? If I saw a reason to join I would, but I don't.	Low use of cooperation to access resources.

tional contracting mechanism midway on the continuum between market and hierarchy (Thorelli, 1986; Williamson, 1985). Our finding can be stated as a formal proposition:

> *Proposition 2. Firms in small-to-medium-sized-enterprise strategic networks are more likely than market (nonnetwork member) firms to obtain outcomes related to increasing interorganizational exchanges of friendship, information, business, and competencies and increasing organizational credibility and access to resources.*

NETWORK STRUCTURE AND ORGANIZATIONAL OUTCOMES

The third research question focused on small-to-medium-sized-enterprise network structure and the relationship between structure and the outcomes of firms' network participation. Broadly stated, our findings indicated that despite similarities in the structure of their administrations, the roles of the two network administrative organizations and the interactive structures of member firms differed substantially. Our evidence suggests that these differences in structure could be attributed to differences in within-network domain similarity. We were then able to draw on these findings on domain similarity and subsequent network structure, as well as on our qualitative data, to help explain why the alpha-net firms reported significantly more outcomes, particularly transformational outcomes, than the beta-net firms.

Network Structure and Domain Similarity

One of the clear findings from our qualitative research was that small-to-medium-sized-enterprise network firms made a sharp distinction between the network administrative organization, or the network-as-organization, and the structure of interactions among member firms, or the network-as-interaction. Although the network administrative organization and its leadership were critical for the formation of the network and were active in carrying out key network activities, its role was seen as somewhat separate from that of network members and was viewed differently in the two networks. Table 7 presents interview data reflecting the opinions and views held by the CEO-owners and top managers in each network on the network-as-organization/network-as-interaction distinction.

Survey responses on links among network firms and with the network administrative organization also confirmed the distinction between the network-as-organization and the network-as-interaction. Our UCINET analysis of confirmed responses on links (see the Appendix) indicated that both networks' administrative structures were totally centralized around the network central offices but that interactions among firms differed substantially, both across firms and across networks. Total centrality meant that all the firms surveyed had interacted with their central network offices during the year of data collection. In network analysis terms, the administrative office

TABLE 7
Differentiating the Network-as-Organization from the
Network-as-Interaction: Qualitative Evidence

Representative Alpha-net Comments	Representative Beta-net Comments
I was thinking of [alpha-net] the organization versus the operating of the members. The intermingling of the members is different from [alpha-net] the organization. The network is the membership, and [alpha-net] is the spirit behind the whole project.	I think the central office of [beta-net] is the most important . . . then you kind of branch out from there . . . to get to know the other members.
Maybe what has happened in the genesis of [alpha-net] is we've made a distinction between [alpha-net] as a separate core instead of being just one of the members. It has almost a separate direction . . . to promote the business, and not necessarily promote the [individual] membership . . . if you promote the business, you are promoting the membership.	I think what happens is that as the associations are made amongst members of [beta-net], you start to get the bypass thing, which is really what you want . . . when firms start dealing with each other directly one to one, and the original organization starts to become a database manager or clearinghouse for information . . . like [beta-net] is doing.
I saw alpha-net as an opportunity to network, and meet other firms. The meetings have been a lifeline . . . and the [alpha-net] organization itself is a valuable asset as well, such as a hub on a wheel, with the spokes coming into it.	It has perhaps worked better since the group [member meetings] disbanded. When [beta-net] set up an office . . . we could go in and work with the staff individually, as opposed to working with the group . . . in meetings.

was the only node in both networks to have a 1.0 local normalized degree centrality. In contrast, alpha-net and beta-net firms also interacted among themselves, but much less than they did with the network central offices. The range for all sample firms' local normalized degree centrality was 0 to .67; thus, there was considerable variance in connectedness, and no member firm in either network was nearly as connected as the network administrative organization.

Although both networks had fully centralized administrative structures, we found major differences in the roles of those structures in the two networks. Alpha-net's administrative office had run regular monthly meetings for board members and the general membership since the network's inception. Alpha-net staffers also distributed newsletters, meeting agendas, and other communications monthly and facilitated frequent group activities for network members. In contrast, although beta-net decision makers initially ran monthly meetings, within the first year they decided in favor of quarterly board meetings and newsletters and annual membership meetings only. They also decided to use a mechanism for coordinating member activities, the netting circuit, in which network staff used facsimile and telephone to contact individual network firms, rather than all members, regarding opportunities. Thus, the administrative structures for alpha-net and beta-net had

differing degrees of administrative coordination. Alpha-net's administrative office used a high degree of administrative coordination through frequent member firm interactions facilitated by its staff. Administrators at beta-net used a low degree of coordination, through individualized, as-needed communications and activities.

How can these large differences in the network administrative structures of two small-to-medium-sized-enterprise networks in the same industry be explained? What was apparent to us was that the two networks were composed of different mixes of firms based on product line. What Van de Ven and Ferry (1980) referred to as differences in domain similarity characterized the two networks. The 19 sampled firms of alpha-net included only 4 primary product lines, representing all but 1 of the product lines sold by the network's members: home furnishings and furniture, millwork, cabinetry, and lumber remanufacturing; only the arts and crafts product category was absent. Variance in product lines was even narrower, with 11 (58 percent) of the 19 sample firms representing a single product line: home furnishings and furniture. Given its homogeneity, the goal of alpha-net was clearly to aid furniture manufacturing and sales activities. Alpha-net's head administrator noted, "We targeted a specific product category, narrowly defined as furniture. The dynamic of what we started then pushed it [network membership] in that direction." Alpha-net members thus had substantial domain similarity, with significant overlap in product lines, resource needs, competencies, and potential customers.

In contrast, beta-net's respondents were far more heterogeneous; what they sold included all 12 major product lines of their networks' members. This included the primary business lines in alpha-net plus additional lines such as high-end sports, marine, and garden products, and musical instrument components. Despite being in the same general industry, beta-net firms could be categorized as being more complementary than competitive, having only partially overlapping resource needs, competencies, and potential customers. As one network executive described the membership development activities of beta-net, "[The network director] traveled around the region contacting and recontacting all types of small and mid-sized wood companies listed in several directories . . . but he also visited many companies not in the directories but just because he saw them during his travels." Beta-net members thus had far less domain similarity than the firms of alpha-net.

For domain-similar networks comprised of potential competitor firms, like those in alpha-net, high coordination appears appropriate, because these firms must work together regularly to overcome their instincts to compete rather than to cooperate. These firms require an external mechanism to support and facilitate ongoing exchanges, especially at the early stages of network development. In contrast, for complementary firms, like those of beta-net, high coordination through a central administrative structure is probably less critical and can even be viewed as something of an interference. For instance, a beta-net respondent commented that "things ran better" once monthly meetings were discontinued and she began interacting di-

rectly with the [beta-net] staff" for business planning and "worked one-on-one" with other beta-net members.

Some network administrative organization involvement is clearly needed if a network is to act as a network. In the case of beta-net, the administrative office and a key supplier were focal points for network activities. The focal role of this key supplier had its roots in the period prior to network formation. Observations and interview data indicated a history of interaction among some beta-net firms and this supplier. For instance, beta-net's director used existing state directories to begin an early network "membership drive," then asked company contacts "who they knew" who might be interested in the network. In contrast, alpha-net's director had had no current state directory to guide initial contacts, so early membership activities involved "getting out on the road" to "find out . . . who was doing what, and where." Further, our market findings regarding the lack of interorganizational relationships among our market sample underscores the small likelihood that alpha-net's domain-similar firms would have had interactions prior to network initiation. Consequently, the beta-net firms' history of interaction, which the alpha-net firms lacked, would have further reduced the need for strong central control after beta-net was formalized. This was not clear to the administrators at first, but resistance by beta-net firms caused them to scale back their efforts at network-wide integration and coordination.

Differences in network structure were also in evidence at the level of firm-to-firm interaction. We refer to this level as the network interactive structure, which excludes links to the network administrative organization. Figures 1 and 2 illustrate this interactive structure at the time of survey administration for each network; structures are based on confirmed links. As noted, we developed the network diagrams using UCINET software with a plotting subroutine called KrackPlot. The figures also show firms' overall exchange density values and local normalized degree centrality values for the network interactive structures. Results indicate that the structures of the two networks differed both in density and local centrality. Density among alpha-net sample firms was twice that among beta-net firms (.25 versus .12), and alpha-net included 7 firms with high local centrality—5 small furniture manufacturers, a cabinetmaker, and a lumber remanufacturer had centrality values ranging from .33 to .67. In contrast, beta-net included only 1 highly central firm (centrality = .50), a relatively large raw wood broker/supplier, and the next highest centrality score was .23.

In sum, at the level of member firm interaction, alpha-net was highly integrated, with a large number of firms (7 of 19) highly involved in the flow of activity within the network. In addition, alpha-net's administrative office was very active in network coordination. Beta-net showed evidence of only modest levels of firm interaction, and much of this interaction was through a single supplier. Although beta-net's network administrative organization was linked to all sampled firms, its role regarding the full network was less active than that of its counterpart at alpha-net.

FIGURE 1

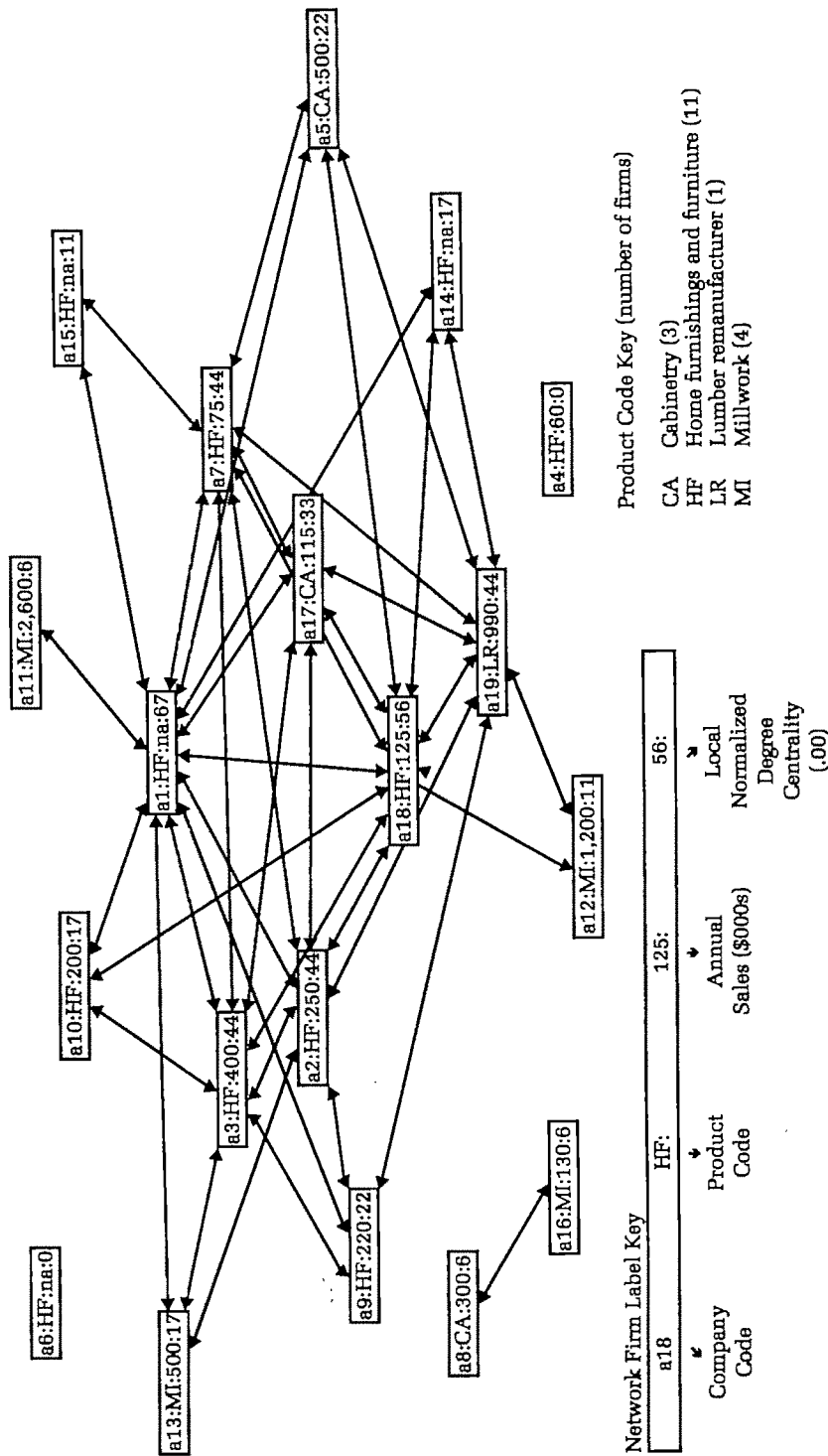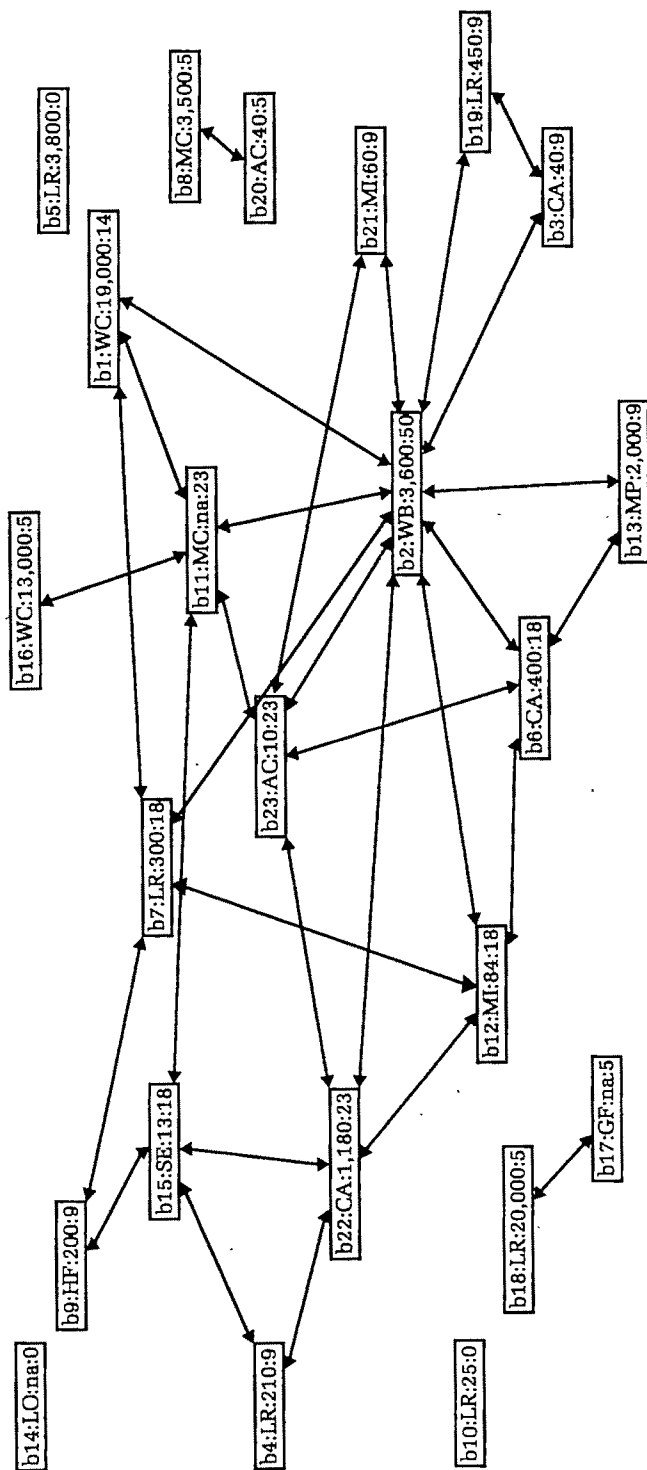### Total Confirmed Alpha-net Links, excluding Administrative Organization[a]

a5:CA:500:22

a15:HF:na:11

a14:HF:na:17

a7:HF:75:44

a4:HF:60:0

a11:MI:2,600:6

a17:CA:115:33

a19:LR:990:44

a1:HF:na:67

a18:HF:125:56

a12:MI:1,200:11

a10:HF:200:17

a2:HF:250:44

a3:HF:400:44

a9:HF:220:22

a8:CA:300:6

a16:MI:130:6

a13:MI:500:17

a6:HF:na:0

Product Code Key (number of firms)

CA   Cabinetry (3)
HF   Home furnishings and furniture (11)
LR   Lumber remanufacturer (1)
MI   Millwork (4)

Network Firm Label Key

a18	HF:	125:	56:
↙	→	→	→
Company Code	Product Code	Annual Sales ($000s)	Local Normalized Degree Centrality (.00)

[a] Overall exchange density value = .25.

FIGURE 2
Total Confirmed Beta-net Links, excluding Network Administration Organization[a]

Network Firm Label Key

b2:	WB:	3,600:	50:
↗	↑	↑	↗
Company Code	Product Code	Annual Sales ($000's)	Local Normalized Degree Centrality (.00)

Product Code Key (number of firms)

AC   Arts & crafts (2)
CA   Cabinetry (3)
GF   Garden furnishings (1)
HF   Home furnishings and furniture (1)
LO   Logging (1)
LR   Lumber remanufacturer (6)

MC   Musical components (2)
MI   Millwork (2)
MP   Marine products (1)
SE   Sports equipment (1)
WB   Wood broker (1)
WC   Wood chips (2)

[a] Overall exchange density value = .12.

In a network with relatively low domain similarity among members, like beta-net, firms have the opportunity to meet their resource needs by replicating traditional, nonnetwork relationships and by linking to such member organizations as suppliers of critical resources. In contrast, networks of domain-similar firms appear to develop decentralized network structures, even though such a structure means interacting with former or potential competitors. In part, such interactions arise because firms have no real alternatives within the network; in addition, they are more likely to view each other as equals and to hope to gain strategic advantage through cooperation. Thus, interaction among domain-similar firms tends to be spread out among many firms rather than be concentrated in a single firm. This may mean, of course, that the development of interactions among domain-similar firms in a network will proceed rather slowly, as we found.

Works by Harrigan (1988) and by Oliver (1990) offer evidence that interorganizational asymmetries provide a stabilizing influence on interorganizational relationships, since asymmetric firms are likely to need each other for critical resources, and they benefit by interactions with dissimilar organizations. These stabilizing asymmetries would not inherently exist among domain-similar firms, which are more likely to be competitors. We argue that domain-similar firms would enter networks with decision-making and resource symmetries that do not provide inherent network stability or ready-made links among firms. Networks of "peer" organizations would thus need to develop multiple stabilizing connections. For alpha-net, this requirement meant multiple firms having a position of centrality and a strong central coordinating body. Our findings contrast with Walker's (1988) argument that centrality is less relevant for understanding domain-similar interorganizational relationship structures than for understanding domain-dissimilar ones. We conclude from our results that domain similarity has an important impact on network structure, which can be stated as a formal proposition:

> *Proposition 3. Small-to-medium-sized-enterprise network structure can be explained by the domain similarity of the firms that compose a network. Specifically, a domain-similar network is likely to have a strong central administrative structure and an interactive structure of high density within which multiple firms are central. A network having relatively low domain similarity is likely to have a moderately weak central administrative structure and a low-density interactive structure with few central firms.*

Network Structure and Outcomes

How do the characteristics of a network's structure help explain the outcomes attained by member firms from network participation? Our results (Tables 4 and 5) indicate that firms in both networks reported a wide range of positive outcomes stemming from their involvement. Thus, it is not un-

reasonable to conclude that small-to-medium-sized-enterprise network success can be attained through a variety of different network structures. However, alpha-net firms did report more outcomes than firms in beta-net, and more transformational outcomes in particular, which we believe can be explained by differences in network structure.

Research on the tie between network structure and outcomes has mostly focused on the position of individual organizations within a network, primarily local centrality, and on how such centrality might affect outcomes (Barley et al., 1992; Walker, 1988). Provan and Milward (1995) offered an alternative to this approach, looking more broadly at overall network structure and network-level outcomes. Our research aims at something between these approaches. Like Provan and Milward, we looked at overall network structure rather than at the positions of individual firms within that structure. Unlike these researchers, however, we were interested in understanding how structure was related to the outcomes experienced by the firms that comprised a network, rather than in outcomes, like client well-being, that may be externally determined.

Provan and Milward (1995) provided evidence that networks achieve higher effectiveness through centralized integration than through decentralized integration. All firms sampled in both our networks were fully connected to their respective network administrative organizations and, consistent with Provan and Milward's conclusion, both alpha-net and beta-net were effective. In addition, alpha-net, with the higher number of outcomes, had an administrative office that was far more heavily involved in efforts to coordinate and integrate the network than the beta-net office. Where our results differ from theirs is that alpha-net was not only centrally integrated, but was also integrated at the firm level, with high density scores and an interactive structure that was far more extensive than that of beta-net. In contrast, the network that Provan and Milward found to be most interactive at the firm or agency level was least effective.

Alpha-net was successful because it had both strong administrative links through its administration (the network-as-organization) and a strong, largely decentralized interactive structure (the network-as-interaction). These dual structures were critical for maintaining coordination and integration among the largely domain-similar entrepreneurial firms of alpha-net, which were far more used to competing than cooperating. Provan and Milward's organizations were domain-dissimilar health and human service agencies that were likely to cooperate to some extent anyway, even in the absence of strong central coordination. If the firms in alpha-net were to achieve any real benefit from network involvement, the links holding the network together had to be strong. Our interviews led us to conclude that the socialization process experienced by former competitors linked in a single, strong network forces them to break old ways of thinking and to work hard to benefit from network participation.

The effectiveness of beta-net was enhanced by interactions between the network administrative organization and individual member firms, which

were appropriate in view of the heterogeneity of the firms in the network. Beta-net firms simply did not have as much in common as alpha-net firms did, and frequent group meetings to share common concerns and problems were not viewed as critical for success. What also helped to pull the network together, however, was the strong central position of a key supplier, an advantage that beta-net firms would not have had through traditional market-based buyer-supplier relationships. Despite this advantage, beta-net was clearly less effective than alpha-net in achieving transformational outcomes for member firms. Because firms had relatively low domain similarity, they had less in common and were less likely than alpha-net firms to be changed in significant ways. In general, the costs of lack of cooperation were less in beta-net, but the benefits of cooperation were also fewer.

Alpha-net's interactive structure of multiple central, domain-similar organizations is consistent with descriptions of Italian industrial districts (Inzerilli, 1990) as having, rather than single central firms, fluid relationships and coordinating roles that flow back and forth among firms depending upon opportunities and activities. Beta-net's structure of one highly central firm among domain-dissimilar ones is consistent with Lorenzoni and Ornati's (1988) case descriptions of the lead firm in a constellation of complementary firms. Although both network models can produce positive outcomes for members, each model is appropriate for a particular mix of firms, and the types of outcomes attained will not necessarily be the same.

Based on our findings and insights on the relationship between small-to-medium-sized-enterprise network structure and outcomes, we propose that, in general, the level and range of outcomes attained by firms in networks can be explained by aspects of network structure. More specifically,

> *Proposition 4a. For domain-similar firms, numerous transactional and transformational outcomes will occur when a small-to-medium-sized-enterprise network's administration is central and active in network-wide coordination and when network interactive structure is dense and decentralized.*

> *Proposition 4b. For firms having low domain similarity, numerous transactional (but not transformational) outcomes will occur when a small-to-medium-sized-enterprise network's administration is central and active in interactions with individual member firms and when interfirm exchange density is low but centralized.*

CONCLUSIONS

Our overall conclusions are summarized in the simplified model presented in Figure 3. We have found that involvement in an SME manufacturing network can be advantageous for firms and have both transactional and transformational outcomes. The model shows that the extent to which

these outcomes will occur depends on the domain similarity of the firms in a network and on how the network is structured. Our results indicated that two aspects of network structure, administrative and interactive structure, intervene to facilitate the process of network involvement in ways that can lead to favorable outcomes for member firms. The type of network structure that is most appropriate for achieving good results depends on the domain similarity of the firms in a network.

Our model clearly links network structure and outcomes. Nonetheless, we do not argue that structure alone, even when consistent with the domain similarity of participants, is sufficient to produce good outcomes for member firms. Both a network's administrative office and the firms themselves must be committed to norms of cooperation and must work toward accomplishing network, as well as firm, goals. We found high levels of commitment and strong leadership in the administration of both alpha-net and beta-net, and the firms we selected for study were obviously ones that were interested in network involvement. Our study offers preliminary evidence that the structure of SME networks is important for network effectiveness, but primarily as a way of facilitating interactions among firms (and network administrators) that are committed to the network concept. Finally, our comparison of network and market firms in the same industry demonstrates that interorganizational relationships within purposefully constructed small-to-medium-sized-enterprise networks are unique and that network involvement can yield positive results that are not likely for nonnetwork firms.

We recognize certain limitations in our research design. First, our network sampling illustrates the "boundary specification problem in network research" (Laumann et al., 1983: 18) and brings to mind case study research-

FIGURE 3
Proposed Model of SME Network
Structure and Outcomes
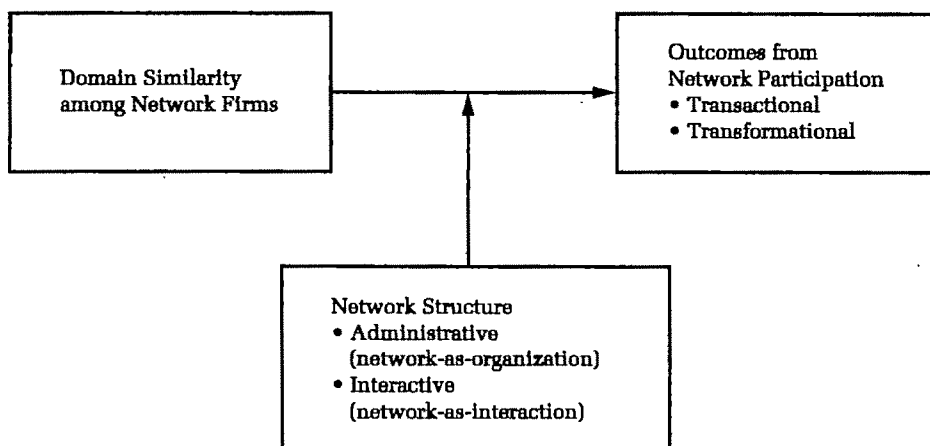
ers' concerns over case representativeness (Miles & Huberman, 1994; Yin, 1989). Our network selection experience provided compelling reasons for reputational sampling, which incorporated systematic and documented procedures to minimize nonrepresentative or biased results. Nonetheless, results are based on an involved subset of the firms in each network and could thus lead to conclusions that would not apply to firms listed as being part of the network but having little involvement.

A second limitation of the study is its inclusion of only two networks. Obviously, we cannot claim that our results are generalizable to other networks, perhaps even within an SME network context. Nonetheless, we believe strongly that the relative paucity of comparative empirical research on network outcomes and the near absence of such work in small-to-medium-sized-enterprise networks justified our research design. Since the SME network phenomenon is relatively new in the United States, there are no industries with large numbers of networks. By examining two networks in the same general industry, we were able to make comparisons that might not otherwise have been possible. In addition, careful selection and in-depth comparison of two networks allowed us to build relationships with network and firm managers and collect data that would not have been possible using a less intensive approach. Our aim was to conduct a study that would draw on both qualitative and quantitative data, not to test hypotheses, but to develop insights that could form the basis of a general, though preliminary, theory of small-to-medium-sized-enterprise networks.

Implications for Network Practice

Network planners and organizers should find it helpful to know that firms can achieve multiple outcomes, both economic (transactional) and noneconomic (transformational) from network participation. However, these outcomes do not appear to be attained equally across all network forms, and the timing of network success may also vary. For instance, the administrative offices of networks of domain-dissimilar firms can take advantage of existing links, familiar value-chain relationships, and the potential for complementary exchanges to build external network credibility rapidly. This is not possible in networks of domain-similar firms, which are likely to need more time and nurturing by the administrative office to achieve the trust needed for network success. Despite advantages of timing, results from this study indicate that relationships among domain-similar firms provided a broader range of outcomes, including potentially longer-lasting organizational change outcomes, than the relationships among domain-dissimilar firms. Network planners and organizers attempting to work with domain-similar firms must be willing to maintain a longer-term perspective and be willing to work closely with network members.

A second implication for practice is that our work supports the key role of a network administrative structure. Although network descriptions by Jarillo (1988) and Thorelli (1986) depict networks as having separate administrative organizations, as they did in our study, this model is not universal,

particularly iñ Europe. We suggest that in the traditional arm's-length U.S. business environment, network administrative organizations are critical; they can help overcome the lack of a tradition and infrastructure supporting network relationships among firms. Such structures, absent in the United States, do exist in Europe. Consistent with Saxenian's (1990) conclusion, our study indicates how important a network administrative organization can be even though its role in network integration may differ with the mix of participating firms. Only when an administration is imposed on network firms by outsiders, like government entities, is network effectiveness likely to be undermined.

Finally, qualitative data from interviews with representatives of market firms indicated that these firms only minimally used interorganizational relationships. The market respondents provided multiple reasons for their lack of participation in interfirm relationships, such as lack of time, no perceived need, and fear of losing proprietary information. U.S. network organizers face the challenge of overcoming these perceptions if they intend to develop SME strategic networks on a larger scale.

In sum, this research supports the idea that strategic manufacturing networks among small-to-medium-sized firms are a viable option to competitive, market-based relationships. Because SME networks are new in the United States, researchers have a unique opportunity both to study the phenomenon as it is evolving and to have an impact on the forms it takes. This study provides a framework for further research on this emerging topic.

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APPENDIX
Network Analysis Measures

We calculated common network analysis measures, including local degree centrality and graph density. Local or normalized degree centrality identifies the number of direct, adjacent connections for each network member and is represented as a proportion between 0 and 1 (Scott, 1991). Density, or the "number of lines in a graph expressed as a proportion of the maximum possible number of lines," also varies from 0 to 1 (Scott, 1991: 74).

Local centrality and density values were based on the number of links confirmed for each sample firm and network administrative organization. We identified a confirmed link when a firm reported engaging in the past year in one of the four exchange types (business, friendship, information, and competency) with another firm and the other firm also reported the exchange. If firm A reported an exchange with firm B but firm B reported no exchange in the past year with firm A, no link was counted. Reciprocation rates calculated for all links were .90 (alpha-net) and .92 (beta-net), representing high interrater reliability for linkage measures.

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ENVIRONMENTAL DETERMINANTS AND INDIVIDUAL-LEVEL MODERATORS OF ALLIANCE USE

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This study, utilizing data drawn from a sample of 433 Norwegian manufacturing firms, examined the direct effects of perceived environmental uncertainty and the moderating effects of key manager orientations in determining alliance use. Results support a multidimensional view of perceived uncertainty and the existence of significant variation in the link between perceived environmental uncertainty and alliance use, which arises as a consequence of key managers' entrepreneurial and individualism/collectivism orientations.

Transaction cost theory, primarily as it was defined by Williamson (1985, 1991), casts interfirm cooperation as a means of maximizing economic or psychological benefits. Resource dependency theory, as expressed by Pfeffer and Salancik (1978), specifies that interfirm relationships are primarily directed by drives to acquire the resources necessary to provide a firm with sustainable competitive advantages. Although these theories provide insight into what motivates interfirm cooperation, past research has not sufficiently explored individual-level influences on decisions by key organizational leaders to use interfirm cooperative relationships or, more specifically, alliance relationships (Smith, Carroll, & Ashford, 1995; Zaheer & Venkatraman, 1995). Alliances, as defined in this study, are structured agreements that establish exchange relationships between cooperating firms but do not involve a freestanding, wholly owned organizational entity.

Entrepreneurial orientation (Lumpkin & Dess, 1996) and individualism/collectivism (Wagner, 1995) are two individual-level orientations that have been proposed as being particularly relevant to understanding cooperative behavior at the individual level. The purpose of this research was to supplement transaction cost and resource dependency theory by exploring the relationship between these two individual orientations and firm-level reactions to environmental and firm-level antecedents of alliance use. This study

makes three unique contributions to investigating the determinants of alliance use. First, it goes beyond the traditional use of objective measures of environmental uncertainty to explore the role of perceived environmental uncertainty in motivating alliance use. Second, past researchers have primarily viewed environmental uncertainty as a unitary concept, but this study yields evidence of the multidimensional nature of environmental uncertainty and investigates the role of each dimension in determining alliance use. Finally, this research extends the traditional use of economics-based factors in explaining alliance use by explicitly considering the moderating effect of key manager orientations upon the relationship between environmental perceptions and alliance use. In the following section, we outline a model of alliance use that considers (1) the direct effects of environmental perceptions, (2) the moderating role of key manager orientations, and (3) various environmental and firm-level factors traditionally included as control variables in most explorations of the determinants of alliance use.

THEORETICAL BACKGROUND

Factors Directly Influencing Alliance Formation

Asserted in transaction cost theory as having a direct effect upon the use of alliance relationships, environmental uncertainty as defined by Milliken (1987) is the perceived inability of an organization's key manager or managers to accurately assess the external environment of the organization or the future changes that might occur in that environment. In agreement with the early work of Miles and Snow (1978), Milliken emphasized that environmental uncertainty was perceptual in nature, not a strictly objective state. Information about the environmental conditions surrounding firms has traditionally been measured either through the use of archival or objective data or through the use of perceptual measures, according to Boyd and Fulk (1996). They argued that the correlations between these two environmental measures were weak because objective measures characterize "external constraints imposed on a firm, while perceptual measures are more appropriate for studying managerial behavior and decision-making" (Boyd & Fulk, 1996: 3). Consistent with our desire to explore the role of managers' orientations in the alliance process, our primary focus in the reported study was perceived uncertainty; however, we also considered objective measures.

Both Buchko (1994) and Milliken (1987) argued that perceived environmental uncertainty, often assumed to be a unitary construct, is in reality multidimensional. Existing alliance research suggests five specific sources of perceived environmental uncertainty. The first source for perceived environmental uncertainty is general uncertainty, or "effect uncertainty," as Milliken labeled it. This type of uncertainty encompasses a firm leader's perceived inability to assess "what the nature of the impact of a future state of the environment or environmental change will be on the organization" (Milliken, 1987: 137). Uncertainty concerning product markets, changing

barriers to foreign trade and investment (Auster, 1987), and rapidly changing economies of scale (Murray & Siehl, 1989) have all been proposed as contributors to general uncertainty and linked to increased cooperative behavior between firms (Devlin & Bleackley, 1988). The second source of perceived environmental uncertainty is the technological environment of a firm. Technological complexity and volatility have been found to be associated with the formation of alliances (Forrest, 1990; Hagedoorn, 1993; Hladik, 1988). Devlin and Bleackley (1988) argued that it is the rapid pace of technological development and the associated high costs that underlie the motive to cooperate. The third source of uncertainty, labeled by Milliken (1987) as "state uncertainty," is the perceived inability to predict a particular component of the environment, such as the actions of competitors or the demands of customers. Harrigan (1988) suggested that the level and form of market turbulence play critical roles in a firm's choice to engage in cooperative behavior. In general, the less predictable a leader believes the market of his or her firm to be, the more likely it is that he or she will be motivated toward alliance use. The fourth source of perceived uncertainty is growing demands for internationalization (Contractor, 1986; Koepfler, 1989). Ohmae noted that, for many industries, the "relentless challenges of globalization will not go away" (1989: 154). These demands, in Ohmae's view, "mandate alliances, making them absolutely essential to strategy" (1989: 143). Often the only avenue for involvement in international trade is through alliance use (Morris & Hergert, 1987). The fifth and final source of uncertainty is key managers' lack of faith in their ability to assess the future potential for growth and profits in their firms' principal industries. Because firms often seek refuge in alliances when faced with mature, low-growth markets (Devlin & Bleackley, 1988), it seems reasonable that it is also true that the greater a key manager's certainty that he or she has properly assessed the future as holding a promise for growth and profits, the less likely it is that he or she will be motivated to utilize alliances.

We propose that perceived environmental uncertainty is a multidimensional construct that can be characterized by the source of the uncertainty. It is further argued that these various dimensions of uncertainty have a direct effect upon alliance use. Accordingly, we propose the first three hypotheses:

> *Hypothesis 1. Key organizational managers will make distinctions among the multiple dimensions of environmental uncertainty, basing those distinctions upon the perceived sources of the uncertainty.*

> *Hypothesis 2. Alliance use will be positively associated with key managers' perceptions of the following sources of environmental uncertainty: (a) high general uncertainty, (b) high technological volatility and demand, (c) low predictability of customer demands and competitor actions, and (d) demands for internationalization.*

Hypothesis 3. Alliance use will be negatively associated with key managers' perceptions of a strong future potential for growth and profits in a firm's principal industry.

Moderators of Perceived Environmental Uncertainty

Rational choice theories, such as transaction cost economics and resource dependency theory, rest on the assumption that decisions are based principally upon economic efficiency. Although a number of recent writers have concluded that theories such as these place too little emphasis upon individual-level factors affecting the human agents within firms (Ghoshal & Moran, 1996; Larson, 1992; Podolny, 1994; Tyler & Steensma, 1995), Williamson (1996) argued that the assumptions of transaction cost economics do not ignore the influence of behavioral factors but are in fact guided by the acknowledgment of "bounded rationality." The choices of decision makers, although intended to be rational, are in fact bounded by a number of individual constraints (Williamson, 1985). Advocates of rational choice theories acknowledge the existence of constraints, but institutional theorists place these constraints at the center of their explanations for organizational behaviors (DiMaggio, 1988; Oliver, 1991). DiMaggio argued that "by emphasizing norms, expectations, and limits to rationality and by developing predictive hypotheses that do not rely on interest aggregation, institutional theorists provide an important corrective to the prevailing domain assumptions and analytic strategies of contemporary organizational theory" (1988: 5). Institutional theory suggests that alliance formation may not only come about as a rational response to the environment, but may also be contingent upon taken-for-granted orientations and cultural norms.

Two such factors that have been proposed as potential moderators of individuals' reactions to organizational and environmental stimuli, but that have remained unexplored in relationship to alliance use, are an individual's entrepreneurial orientation (Covin & Slevin, 1989, 1991; Covin, Slevin, & Schultz, 1994; Lumpkin & Dess, 1996) and cultural orientation in the form of individualistic or collectivist tendencies (Triandis, Bontempo, Villareal, Asai, & Lucca, 1988; Wagner, 1995). These individual-level variables are important, according to Tyler and Steensma (1995), because past research has shown that the basic beliefs, values, and predispositions of key decision leaders within firms can have a significant effect on firm-level strategic decisions.

Entrepreneurial orientation. Miller and Friesen (1982) observed a significant difference in how the managers of entrepreneurial firms and the managers of more conservative firms reacted to environmental variables. A firm whose management team has an entrepreneurial orientation is, according to Covin and Slevin, characterized by risk taking "in the face of uncertainty; the extensiveness and frequency of product innovation and the related tendency toward technological leadership" (1991: 10). Those authors concluded that the entrepreneurial orientation of a firm's leadership reflects an overall strategic orientation that has a significant impact on how organ-

izational leaders interpret and respond to the firm's environment. The entrepreneurial orientation of a firm's key manager may play an important role in the firm's strategic behavior because of the orientation's impact on how the leader frames the risk inherent in the firm's environment. Entrepreneurially oriented managers are not necessarily more willing to take risks, according to Palich and Bagby (1995), but they are more likely to frame seemingly risky and uncertain environments in a positive light than are more conservative individuals. Drawing on these assumptions, we predict

> *Hypothesis 4. The entrepreneurial orientation of a firm's key manager will moderate the relationship between alliance use and the key manager's perceptions of each dimension of environmental uncertainty. Perceptions of environmental uncertainty will have less influence over more entrepreneurial managers.*

Individualism and collectivism. Although managers may consider certain transaction costs inherent in decisions regarding firm-level cooperative behavior, their cultural orientations may significantly influence their perceptions of those transaction costs. Individualism/collectivism (Hofstede, 1980, 1984a, 1984b) has emerged as the cultural dimension most often associated with cooperative behavior (Wagner, 1995). People with individualistic orientations believe that the self is the basic unit of survival, value independence and self-sufficiency, give priority to personal goals, and place high value on self-direction, social justice, and equality. People with collectivist orientations emphasize the importance of belonging to a stable, select in-group, value cooperation with the in-group, and expect the group to help provide for the welfare of group members (Hofstede, 1980, 1984a; Hui, 1988; Hui & Triandis, 1986; Hui & Villareal, 1989). Wagner asserted that individual or collective orientations can have a significant moderating influence, even "within a single societal culture" (1995: 168), on the decision to form cooperative relationships. In general, he concluded that individuals with more collectivist orientations will be more likely to form cooperative relationships. Following his reasoning, we offer the next hypothesis:

> *Hypothesis 5. The orientation toward individualism/collectivism of a firm's key manager will moderate the relationship between alliance use and the key manager's perceptions of each dimension of environmental uncertainty. Perceptions of environmental uncertainty will have a greater influence over more collectivist managers.*

A key manager's individualism/collectivism may not only moderate the relationship between environmental uncertainty and alliance use, but may also moderate the hypothesized relationship between an individual's entrepreneurial orientation and alliance use. McGrath, MacMillan, and Scheinberg (1992) concluded from their research that high levels of individualism were significantly related to entrepreneurial orientations. Shane (1993) sup-

ported this conclusion by establishing a strong link between high levels of individualism and high levels of innovation. We propose the following:

> *Hypothesis 6. The orientation toward individualism or collectivism of a firm's key manager will moderate the effects upon alliance formation of the interaction between a key manager's entrepreneurial orientation and perceptions of each dimension of environmental uncertainty.*

Control Variables

Although the primary focus of our proposed model of alliance use was the direct impact of perceived environmental uncertainty and the moderating effect of key manager orientations, it seemed prudent to control for three objectively measured factors found by past research to be directly linked to alliance use. In many analyses of strategic alliance use, a firm's principal industry has been used as a surrogate for a number of factors and assumed to provide an objective measure of the firm's environment (Morris & Hergert, 1987; Osborn & Baughn, 1990). Resource dependency theory specifies a second control factor—firm size. Firm size, assumed to be indicative of a firm's economies of scale and resource sufficiency (Gulati, 1993) has been directly linked to the use of alliances (Ghemawat, Porter, & Rawlinson, 1986). Past findings regarding firm size have been mixed (Gulati, 1993), but in general larger firms have been found to be more likely to engage in alliance relationships than smaller firms (Hagedoorn & Schakenraad, 1994). Past research has also suggested that the extent of a firm's international trade is a direct indicator of alliance use (Morris & Hergert, 1987). Murray and Siehl (1989) concluded that alliances help firms tap the significant economies of scale presented by an international marketplace. Past research has indicated important links between international trade and alliance use.

RESEARCH DESIGN

Sample

Past alliance research has not addressed individual-level characteristics in part because of the difficulty of determining what individuals have a significant impact upon firm-level behaviors. In this study, we overcame this difficulty by utilizing a sampling frame that included manufacturing firms with fewer than 500 but at least 6 employees and by using a key informant approach that targeted the owner or general manager of each selected firm. Miller (1983) argued that, for a firm of the size included in this study, the owner and chief executive (often the same individual) acts as the brain of the organization and is the key determinant of its strategic posture. Lumpkin and Dess believed this type of approach is "consistent with classical economics, in which an individual entrepreneur is regarded as a firm" (1996: 138) and that "the small business firm is simply an extension of the individual who is in charge" (1996: 138). We established the minimum-number-of-

TABLE 1
Random Stratified Sampling Results

Product Types	Population by Type[a]	Type as Percentage of Total Population	Number Drawn for Sample[b]	Total Usable Returns	Percentage of Total Usable Surveys
Food and kindred products	370	4.70%	123	31	7.16%
Fish products	259	3.29	86	19	4.39
Wood and wood products, except furniture	686	8.71	229	35	8.08
Printing, publishing, and allied industries	615	7.81	205	46	10.62
Rubber and miscellaneous plastic products	791	10.04	264	30	6.93
Chemical products	685	8.70	228	43	9.93
Transport equipment	872	11.07	291	14	3.23
Industrial and commercial machinery and computer equipment	1,653	20.98	551	86	19.86
Electronic and other electrical equipment except computer equipment	1,713	21.74	571	73	16.86
Computer programming, data processing, and other computer services	235	2.98	78	33	7.62
Other				23	5.31
Totals	7,879		2,626	433[c]	

[a] The population drawn for sampling included all Norwegian manufacturing firms with at least 6, but fewer than 500, employees.

[b] We randomly selected 33 percent of the total population for each industry type.

[c] A total of 604 surveys were returned in waves one and two. Of these, 161 (6.13%) were returned unopened owing to business closings, bankruptcies, and address changes, resulting in a final sample size of 2,465. Exclusion of 10 incomplete returned surveys resulted in 433 usable surveys (17.57%).

employees requirement because we thought that for manufacturing firms, alliance activity would require some minimum level of resources. This is not to say very small firms do not engage in alliance activities, but that their limited resources make the likelihood of alliance use minimal. The sample was a random, stratified sample of all manufacturing firms in Norway meeting our size and industry specifications.[1] Table 1 provides the population and sample statistics for the study and lists the ten industry classifications chosen for use in the study.

Surveys were mailed in two separate waves: we first mailed surveys to all 2,626 manufacturers selected for the study and then mailed surveys again

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[1] Our sample was developed through the use of KOMPASS On-Line Systems. For European markets, KOMPASS is considered to be a reliable source of the names and addresses of registered businesses.

to those firms that did not respond to the first mailing within 30 days. Out-of-business and bad address returns were excluded from the second wave of mailing.

Of the 2,626 surveys initially mailed, 161 (6.1%) were returned because of bad addresses, bankruptcies, and business closings. Completed surveys were returned by 433 (17.6%) of the remaining 2,465 firms. A univariate analysis of variance (ANOVA) procedure revealed no significant differences in responses for any of the study's independent or dependent variables when wave was considered as a main effect. A telephone survey of 50 nonrespondents provided an additional assessment and revealed that 28 (56%) had some form of alliance relationship. This figure closely parallels the 58 percent (252 out of 433) of survey respondents with such relationships. The most prevalent reasons given for nonresponse included "I'm too busy" (44%) and "The questionnaire is not relevant to my business" (10%). Of the individuals responding, 45.9 percent held some ownership in the firms, with 49.3 percent of those holding a majority ownership position, providing support for the assumption that the respondents were key decision leaders within their respective firms. An ANOVA procedure revealed no significant differences in responses based on ownership/nonownership.

Measures

Alliance use. Alliance use was based on reports by the key managers regarding the firms' use or nonuse of alliance relationships. Most firms reporting alliance use reported having multiple types of alliance relationships; these included joint ventures; equity investments from other companies; long-term agreements relating to marketing, distribution, or production; export management or trading companies; and technology alliances relating to either product or process research and development. Although a number of the firms reporting alliance use also reported having less "strategically motivated" (Hagedoorn, 1993) types of relationships, such as outside contracting and purchaser-supplier relationships, none held these types of relationships exclusively. Because our level of analysis was key managers and the firms as extensions of their key managers, and our desire was to characterize the firms, not specific alliance relationships, we did not view the fact that most firms reporting alliance use had multiple types of alliance relationships as problematic.

Environmental uncertainty. In accordance with our desire to study the moderating effects of individual-level factors on decision leader's perceptions of firm environments, we used an environmental perception scale developed by Covin and Slevin (1989) and Schultz, Slevin, and Covin (1995) in this study. This scale comprises five items drawn from Miller and Friesen's (1982) environmental dynamism measures, five items from Khandwalla's (1977) external environment measures, and five original items developed by Schultz, Slevin, and Covin (1995). Scale items focus on behavior, assessing environmental perceptions relating to general uncertainty, technological demand and volatility, predictability of markets, and the potential for future
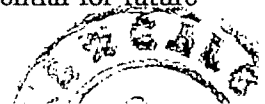
growth and profits. We added two additional items assessing perceptions of the extent to which internationalization seemed needed for firm success. All items had a five-point response scale and, with the exception of the growth and profit items, were worded to assess high levels of uncertainty. The growth and profit questions were worded to reflect perceptions of a high level of certainty regarding the future.

A principal components factor analysis of these environmental perception items with "varimax" rotation resulted in five factors with eigenvalues greater than 1.00. Table 2 provides the texts of individual items, their factor loadings, and reliability estimates (α) for the five scales formed from the results of the analysis. The five-factor structure was well defined, with all items except one having high loadings (>0.50). The factors were easily interpreted and consistent with our hypothesized dimensions of environmental perceptions. Reliability estimates were all within reasonable bounds, ranging from .60 to .79. The multidimensional structure evidenced is consistent with both Milliken's (1987) and Buchko's (1994) arguments.

Moderator variables. We assessed the first hypothesized moderator variable, entrepreneurial orientation, using items drawn from the work of Covin and Slevin (1988, 1989). The eight-item, five-point scale ($\alpha = .81$) assesses the tendencies of a firm's managers toward risk taking, innovation, and proactiveness toward competitors. Although the scale items focus on different aspects of an entrepreneurial orientation, Covin and Slevin argued that the items are "empirically related and constitute a distinct, unidimensional strategic orientation" (1989: 79). In order to verify this contention, we factor-analyzed the items. The principal components factor analysis resulted in a solution in which all items loaded above 0.50 on a single factor with a factor eigenvalue of 3.56—providing factorial validity for the entrepreneurial orientation construct.

The second moderator variable, individualism/collectivism, was assessed via ten items developed by Erez and Earley (1987). Earley (1989) wrote that past cross-cultural research had shown that these value-anchored measures were psychometrically valid, and Wagner (1995) showed an individual/collectivist orientation to have a significant moderating effect upon cooperation within groups. A factor analysis of data from the Norwegian questionnaire (the one used in this study) resulted in a factor solution in which six of the ten items were retained. Four of the original items either cross-loaded or had factor loadings below 0.50 and were dropped from consideration. Earley (1989) also found that two of the four items lacked factor validity. A factor analysis of the remaining six items resulted in a factor solution in which all items loaded above 0.50 on a single factor with a factor eigenvalue of 2.49. The summate of these six items was used in this study ($\alpha = .71$).

Control variables. Three control variables were included in the analysis. The first, a firm's principal industry, was included as a measure of objective firm environment. We chose classifications, nine of which were major Standard Industrial Classification (SIC) industry categories typically

TABLE 2
Results of Factor Analysis of Environmental Uncertainty Items

Items[a]		Factors			
	1: General Uncertainty	2: Technological Demand and Volatility	3: Potential for Future Growth and Profits	4: Predictability of Customer Demands and Competitor Actions	5: Demands for Internationalization
1. With respect to our industry					
a. Our company must rarely change its marketing practices to keep up with the market and competitors. / Our company must change its marketing practices frequently (e.g., semi-annually).	.40	.18	.33	.34	-.17
b. The rate at which products and services are getting obsolete in the industry is very slow (e.g., basic metals). / The rate of obsolescence is very high (as in some fashion goods).	.19	.52	.31	.39	-.25
c. Actions of competitors are quite easy to predict (as in some basic industries). / Actions of competitors are unpredictable.	.13	.14	.06	.79	.08
d. Demand and consumer tastes are fairly easy to forecast (e.g., for milk products). / Demand and tastes are almost unpredictable.	.08	.13	.04	.80	.09
e. The production and service technology is not subject to very much change and is well established (e.g., in steel products). / The modes of production and service change often and in a major way (e.g., advanced electronic components).	.10	.69	.21	.41	-.03
2. How would you characterize the external environment within which your company functions?					
a. Very safe, little threat to the survival and well-being of my company. / Very risky, one false step can mean my company's undoing.	.72	.19	.04	.11	.15
b. Rich in investment and marketing opportunities. / Very stressful, exacting, hostile; very hard to keep afloat.	.74	-.08	-.07	.14	.11
c. An environment that the company can control and manipulate to its own advantage, such as a dominant firm has in an industry with little competition and few hindrances or competitive forces. / A dominant environment in which the company's initiatives count for very little against the tremendous political, technological or competitive forces.	.86	.03	-.12	.01	.09
d. An environment demanding little in the way of technological sophistication. / Technologically, a very sophisticated and complex environment.	.15	.82	.12	.08	.14

TABLE 2 (continued)

Items[a]	Factors				
	1: General Uncertainty	2: Technological Demand and Volatility	3: Potential for Future Growth and Profits	4: Predictability of Customer Demands and Competitor Actions	5: Demands for Internation-alization
3. How much research and development activity takes place within your company's principal industry?					
a. Virtually no R&D in industry (e.g., bakery). / Extremely R&D oriented industry (e.g., telecommunications).	.02	.80	.15	.05	.26
4. With respect to our industry …					
a. Our company can be successful by focusing sales or services within the region in which we are located. / To be successful, our company must seek to expand its sales or services into regions other than the one in which we are located.	.09	.07	.05	.11	.77
b. Our company can be successful by focusing our sales or services within Norway. / To be successful our company must seek to extend its sales or services outside of Norway.	.16	.13	.14	-.02	.76
5. Other attributes of our company's principal industry …					
a. Average industry profits are very low. / Average industry profits are very high.	-.40	.24	.57	.02	.20
b. Projected long-term (five years or more) industry profits probably will be very low. / Average industry profits are very high.	-.30	.17	.52	.12	.40
c. The market growth rate for our industry for the last three years has been very low. / The market growth rate for our industry for the last three years has been very rapid.	.08	.14	.82	.06	-.00
d. The projected long-term (five years or more) market growth rate for our industry indicates very slow growth. / The projected long-term (five years or more) market growth rate for our industry indicates very rapid growth.	.03	.12	.80	.07	.10
e. The competitive intensity within our industry is minimal. / The competitive intensity within our industry is extreme.	.83	.19	.07	.07	-.05
Eigenvalues	4.31	2.53	1.51	1.12	1.01
Percentage of variance explained	25.4	14.9	8.9	6.6	6.0
Alpha	.69	.79	.74	.62	.60

[a] All items employed a five-point Likert-type response scale.

utilized in alliance studies. Given the importance of the fishing industry in Norway, we split the food products classification into two categories. The category descriptions provided to the survey respondents appear in Table 1. The second control variable included was firm size. Determining the appropriate measure to indicate organizational size is somewhat problematic (Osborn & Baughn, 1990). Firm assets, sales, and number of employees are the variables most often used as size indicators. For the purposes of this study—and in view of the assumption that small, closely held firms would be likely to provide more accurate information about employees than about sales or assets—organizational size was measured as number of reported employees. The final control variable included was the level of a firm's current international involvement, as reflected by the value of its current export sales expressed as a percentage of total sales.

Procedures

Survey translation. The survey was originally developed in English and, consistent with the recommendations of Brislin (1980), was translated through a back-translation process into Norwegian. We revised all industry terminology to fit the Norwegian context.

Data analysis. As noted, we tested for differences in responses to wave one and wave two surveys by means of a univariate analysis of variance in which mailing wave was the main effect. This procedure provided comparisons of both early and late respondents and of respondents and nonrespondents. The results of this procedure indicated no differences in response. We explored the relationship among study variables using a logistic regression procedure. The beta coefficients provided by a logistic regression procedure give the change in the logarithmic odds of obtaining the outcome variable when there is a change of one unit in the predictor variable. If the beta for a variable is significant and positive, then the variable increases the odds of the outcome. If the beta is significant and negative, then the odds of the outcome are decreased (Bilimoria & Piderit, 1994).

RESULTS

Table 3 provides the summary statistics and correlations. This study directly addresses the role of perceptions of environmental uncertainty in determining alliance use and the moderating role of key manager orientations. In order to establish the influence of these variables above and beyond the influence of objectively measured environmental and firm-specific factors, we calculated four separate logistic equations. Table 4 presents results for the whole sample, with the coefficients for each separate industry category presented in Table 5.

Model 1 is the base model with control variables only. In model 2, the environmental perception measures were introduced. Because there were no significant changes in the coefficients for the control variables, there was little reason to conclude that there was confounding. In model 3, both the

TABLE 3
Descriptive Statistics and Correlations[a]

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10
1. Industry type[b]												
2. Export intensity	13.76	26.96	-.04									
3. Company size	42.21	65.99	-.07	.16***								
4. General uncertainty	2.99	0.63	.07	.06	.03	(.69)						
5. Technological demands and volatility	2.92	0.96	.34***	.13**	.04	.33***	(.79)					
6. Potential for growth	2.61	0.77	.21***	.17***	.02	-.02	.41***	(.74)				
7. Predictability	2.85	0.79	.03	.07	.02	.32***	.45***	.19***	(.62)			
8. Internationalization	3.11	1.23	.07	.56***	.12*	.19***	.22***	.24***	.14**	(.80)		
9. Entrepreneurial orientation	3.01	0.72	.19***	.16**	.01	.13**	.54***	.41***	.19***	.30***	(.81)	
10. Individualism/collectivism[b]	3.61	0.50	.02	.13***	.09	.03	.05	.08	-.04	.06	.05	(.71)
11. Alliance use/nonuse[b]			-.03	.23***	.27***	.16***	.15***	.03	.01	.24***	.16***	.10*

[a] Coefficient alpha reliability estimates are in parentheses. $N = 433$.

[b] These correlations are Spearman rank-ordered statistics; all others are Pearson product-moment statistics.

  * $p < .05$

  ** $p < .01$

  *** $p < .001$

TABLE 4
Results of Logistic Regression Analysis for Alliance Use/Nonuse[a]

Variable	Model 1	Model 2	Model 3	Model 4
Constant	−0.070	−2.218**	−3.123**	−10.576†
Industry type	(cat)†	(cat)†	(cat)†	(cat)*
Export intensity	0.019***	0.012*	0.011†	0.014*
Company size	0.005**	0.004**	0.004*	0.004**
General uncertainty		0.538**	0.542**	17.069**
Technological demand and volatility		0.313*	0.228	0.446
Potential for growth and profits		−0.081	−0.146	−9.865*
Predictability of customers and competitors		−0.319*	−0.294†	−8.503
Demands for internationalization		0.271*	0.252*	3.691
Entrepreneurial orientation			0.263	1.532
Individualism/collectivism			0.149	1.156
General uncertainty × entrepreneurial orientation				−4.990*
Technological demand and volatility × entrepreneurial orientation				0.432
Potential for growth and profits × entrepreneurial orientation				2.852*
Predictability of customers and competitors × entrepreneurial orientation				2.384
Demands for internationalization × entrepreneurial orientation				−1.134
General uncertainty × individualism/collectivism				−4.452*
Technological demand and volatility × individualism/collectivism				−0.122
Potential for growth and profits × individualism/collectivism				2.902*
Predictability of customers and competitors × individualism/collectivism				2.424
Demands for internationalization × individualism/collectivism				−1.008
General uncertainty × entrepreneurial orientation × individualism/collectivism				1.339*
Technological demand and volatility × entrepreneurial orientation × individualism/collectivism				−0.101
Potential for growth and profits × entrepreneurial orientation × individualism/collectivism				−0.863*
Predictability of customers and competitors × entrepreneurial orientation × individualism/collectivism				−0.705
Demands for internationalization × entrepreneurial orientation × individualism/collectivism				0.334
−2 logarithmic likelihood	515.52	486.94	484.73	465.66
χ^2	61.74***	86.40***	88.62***	107.70***
df	12	17	19	34
Overall hit rate[b]	66.59%	67.30%	68.25%	70.38%
Pseudo R^2	.11	.15	.16	.19

[a] Betas for individual industry types are reported in Table 5; the significance levels reported above are for the overall effect of the industry categories. $N = 433$.

[b] Random proportional chance model hit rate = 51.34%.

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

TABLE 5
Results of Logistic Regression Analysis for Alliance Use/Nonuse by Industry Type[a]

Variable	Model 1	Model 2	Model 3	Model 4
Industry type	(cat)†	(cat)†	(cat)†	(cat)*
Food and kindred products	0.83*	0.16**	1.12*	1.39**
Fish products	−1.08*	−0.99†	−0.95†	−1.23*
Wood and wood products, except furniture	−0.49	−0.38	−0.35	−0.31
Printing, publishing, and allied industries	0.30	0.32	0.30	0.41
Rubber and miscellaneous plastic products	−0.41	−0.37	−0.40	−0.53
Chemical products	0.01	0.13	0.11	0.02
Transport equipment	1.08	1.00	0.99	0.78
Industrial and commercial machinery and computer equipment	−0.33	−0.42†	−0.44†	−0.48†
Electronic and other electrical equipment except computer equipment	−0.09	−0.21	−0.20	−0.10
Computer programming, data processing, and other computer services	0.58	0.16	0.18	0.31

[a] A deviation coding scheme was used. The logistic regression coefficient contrasts each industry type to the average effect of all types. See Table 4 for the full model.
  † $p < .10$
  * $p < .05$
  ** $p < .01$
  *** $p < .001$

entrepreneurial orientation scale and the individualism/collectivism scale are present. The coefficients for neither scale are significant, indicating no direct effect; however, a number of changes in the coefficients for the environmental perceptions measures provide evidence of a moderating relationship (Hosmer & Lemeshow, 1989). Model 4 is the full model with all two-way and three-way interactions. Model 4 demonstrates an improvement over the first three models as measured by the pseudo R^2, for which values increased from approximately .11 to about .19. A strong improvement is also seen when the hit rate for model 4 (70.38%) is compared to those for a random proportional chance model (hit rate = 51.34%) and a simple model (hit rate = 58.20%).[2] The chi-square values for all models are significant, indicating that their fit is satisfactory and that the logistic results can be meaningfully interpreted.

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[2] To assess the outcomes at each model stage, we calculated a pseudo R^2 as $R^2 = 100 (L_0 - L_p)/L_0$, where L_0 is the log-likelihood for the null model in which all parameters are set to zero and L_p is the log-likelihood for a model with the parameters of interest (Hosmer & Lemeshow, 1989: 148). The random proportional chance model is given by the equation $p^2 + (1 - p)^2$, where p is the probability of an event's having occurred (Gulati, 1995: 103). The hit rate for a "simple model" is arrived at by predicting all outcomes in the largest outcome group (Hosmer & Lemeshow, 1989).

Perceived Environmental Uncertainty

The results of model 2 suggest that not only do key managers distinguish between perceived sources of environmental uncertainty, as proposed by Hypothesis 1 and supported by the results of the factor analysis, but also that these perceptions have a significant relationship to alliance use. All four of the dimensions proposed in Hypothesis 2 were found to be significant. Three of the four dimensions specified in Hypothesis 2 had effects in the expected direction. Results for one dimension—low predictability of customer demands and competitor actions—were contrary to prediction. Model 2 does not support Hypothesis 3 regarding perceptions of a future potential for profit and growth but, as will be seen later, when the proposed moderators are considered this hypothesis also receives support.

Moderating Variables

The results of model 4 indicate a significant three-way interaction between a manager's individualism/collectivism orientation, entrepreneurial orientation, and two of the five perceived environmental uncertainty dimensions—general uncertainty and perceptions of future potential for growth and profits. In order to explore the three-way interactions, we split each orientation measure at the median to form high and low subgroups. We then divided the sample into these four subgroups: individualistic managers with high or low entrepreneurial orientations, and collectivistic managers with high or low entrepreneurial orientations. We obtained logistic coefficients for the two significant environmental perception dimensions by conducting separate logistic regression analyses for each subgroup. The coefficients obtained for each perceived environment measure for each subgroup were then plotted (results are not shown) in order to probe the interaction effect.

The three-way interactions compare whether the relationship among a manager's entrepreneurial orientation, the perceived uncertainty dimension, and the odds of alliance use are greater for more collectivistic or more individualistic managers. The interaction analysis indicates that the increase in the odds of alliance use occurring as a result of perceived general uncertainty is greater for collectivistic managers than for individualistic managers. The increase will be the greatest for collectivistic managers with low entrepreneurial orientations and lowest for individualistic managers with high entrepreneurial orientations. These results provide support, at least for the dimension of general uncertainty, for Hypotheses 4, 5, and 6.

The negative sign of the main effect for a perceived potential for future growth and profits in a firm's principal industry is consistent with Hypothesis 3, and it indicates the greater the perceived future potential for growth and profits, the lower the odds of alliance use. The interaction analysis suggests that the size of the decrease in the odds of alliance use occurring as a result of this perceived environmental dimension is larger for more collectivistic managers. The size of the decrease in the odds for alliance use will be smaller for individualistic managers with low entrepreneurial orienta-

tions. An individualistic or collectivistic orientation has almost no impact, in regards to the relationship between a perceived potential for growth and profit and alliance use, on the odds of alliance use for managers with high entrepreneurial orientations.

DISCUSSION AND CONCLUSION

The results of this analysis support a number of past assumptions regarding alliance use while at the same time providing three unique perspectives on the link between environmental uncertainty and alliance use. First, the results of the logistic regression analysis provide evidence that how a firm's key manager perceives the environment is a significant determinant of alliance use. Because a number of objective measures were entered into the model prior to the perceptual measures, the model improvement suggests that these perceptual measures contribute information not provided by the objective measures.

Second, the results of the factor analysis for the perceived environmental uncertainty items provide a unique unpacking of the environmental uncertainty construct. This finding supports the arguments of Miles and Snow (1978), Milliken (1987), and Buchko (1994) that environmental uncertainty should be considered a multidimensional construct. The findings suggest that key managers do distinguish between dimensions of environmental uncertainty on the basis of the perceived sources of the uncertainty. Four of the five sources of uncertainty we proposed were found both to significantly predict alliance use and to have effects in the expected direction. Perceptions of general uncertainty, high technological demands, and volatility and demands for internationalization all significantly increased the odds of alliance use. As hypothesized, a perception of the potential for future growth and profit in a firm's principal industry that decreases a key manager's perceived uncertainty regarding this dimension also decreases the odds of alliance use. The inverse relationship between perceived low predictability of customer demands and competitor actions and alliance use was the lone unexpected finding. This finding suggests that, although alliance use is motivated by perceptions of environmental uncertainty, for key managers to choose to employ alliance relationships, there must be at least some minimum level of perceived predictability—specifically, predictability relating to customer demands and competitor actions.

A third unique aspect of this research is the suggestion that the relationship between perceived environmental uncertainty and alliance use is not the complete story. As was hypothesized, the results indicate a significant interaction between key manager orientations, environmental perceptions, and alliance use. Specifically, how managers respond to at least two of the environmental uncertainty dimensions, in terms of increasing the odds of alliance use, appears to vary significantly with the managers' entrepreneurial and individualism/collectivism orientations. This finding supports the arguments of Larson (1992) and of Ghoshal and Moran (1996) that schol-

ars should not ignore individual-level factors in seeking explanations for alliance use. The different responses elicited by considering key managers' entrepreneurial orientations suggest that, as Palich and Bagby (1995) argued, entrepreneurs and more conservative managers frame environmental conditions quite differently. The findings are consistent with Begley and Boyd's (1987) contention that entrepreneurs are energized rather than threatened by uncertainty. The fact that perceptions of a potential for future growth and profits has little impact on entrepreneurial managers suggests that environmental perceptions of either uncertainty or certainty have less of an impact on entrepreneurs than they do on more conservative managers. The significance of the three-way interactions supports the findings of McGrath and colleagues (1992), Morris and colleagues (1993), and Shane (1993) regarding the relationship of individualism/collectivism and an entrepreneurial orientation. The three-way interactions support the hypothesis that the relationship between a key manager's entrepreneurial orientation and how he or she views the environment varies with the manager's individualism/collectivism. When considered in interaction with the manager's entrepreneurial orientation, our findings suggest that in general the odds of alliance use being predicted by perceptions of general uncertainty are greatest for collectivistic key managers with low entrepreneurial orientations. Conversely, the odds of alliance use as predicted by a perception of a potential for future growth and profits decrease the most for collectivistic key managers with low entrepreneurial orientations. This is not to say that the link between environmental uncertainty and alliance use will hold only for managers with this combination of individual orientations, but that our results suggest this combination will be most influenced by perceived environmental uncertainty or, conversely, by certainty about a firm's environment.

The findings of this research suggest that a more explicit consideration of the individually held norms and individual orientations prescribed by institutional theorists can enhance the rational choice perspectives of transaction cost economics and resource dependency theory. Although not directly affecting alliance use or nonuse, these taken-for-granted factors significantly influence perceptions of environmental uncertainty and its link to the use of alliances. This research provides a perspective that is predicated upon the assumption that leader orientations and cultural norms will influence the choice of alliance use or nonuse in response to environmental uncertainty by influencing both how environmental uncertainty is perceived and the range of response behaviors that are deemed acceptable.

A compelling extension for this research would be the use of these variables in an examination of the choice of governance forms for alliance relationships. Transaction cost theorists assume that governance structures evolve in response to environmental uncertainty and fears regarding opportunistic behavior on the part of a firm's alliance partners (Gulati, 1993; Williamson, 1991). Resource dependency theorists take a power perspective

in assuming that structure evolves on the basis of desire for control over critical resources (Oliver, 1991; Pfeffer & Salancik, 1978). While providing a seldom-seen view of firms and individual-level factors differentiating organizations that use alliances and those that do not, the present research also provides three potentially significant extensions of the assumptions of both transaction cost and resource dependency theories regarding the choice of alliance structures. These extensions offer a number of considerations for future research. First, perceptions of environmental uncertainty may influence not only the choice to use an alliance relationship, but also the structure chosen for the alliance. Second, the multidimensional structure of perceived environmental uncertainty evidenced in the findings of this research suggests that the choice of alliance structures may be contingent on the source of the perceived uncertainty as well as on the level of uncertainty, as prescribed by transaction cost theories. Third, although transaction cost and resource dependency theorists both assume that structure is based on rational choices people make in response to environmental uncertainty, the findings of this research suggest, consistent with institutional theory assumptions (DiMaggio, 1988; Oliver, 1991), that the taken-for-granted orientations and norms of key decision leaders may influence or at least constrain the choice of structures.

Two important potential limitations for this research merit discussion. First, there was the potential for common method variance, given the perceptual nature of a number of this study's variables. However, the relatively low correlations found among the perceptual measures suggest that common method variance was not a problem. Additionally, Boyd and Fulk argued that common method variance is generally only problematic "for topics which have strong sentiments, such as job satisfaction or stress" (1996: 10). Our restricted sample was a second potential limitation. To support our key manager approach, we restricted the sample to manufacturing firms with fewer than 500 employees. There is nothing in our findings to suggest that, if the key influencers of firm-level decisions within larger organizations could be identified, the results of our analysis would not hold for those larger firms. A second restriction was our analysis of a single country with a fairly homogeneous culture. Given the importance of individual-level orientations in our analysis, it may well be that significant differences would be seen in cultures other than the one examined.

Despite these limitations, this study supports the hypothesis that perceived environmental uncertainty is a multidimensional construct. The findings indicate that perceived environmental uncertainty adds explanatory value in predicting alliance use over that offered by objective measures of a firm's environment. The study provides evidence that variations in key managers' orientations—specifically, their entrepreneurial and individualism/collectivism orientations—can have an effect upon how the managers perceive the environments of their firms and react to those perceived envi-

ronments in terms of alliance use. Taken together, the findings of this research enrich the picture of the organizational choice to use alliances.

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WORKING ABROAD, WORKING WITH OTHERS: HOW FIRMS LEARN TO OPERATE INTERNATIONAL JOINT VENTURES

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Successful international joint ventures entail both learning to operate across national boundaries and learning to cooperate. Hypotheses grounded in organizational learning theory were tested with event-history analysis and data on 1,493 expansions of 25 large Dutch firms between 1966 and 1994. Experience with domestic joint ventures and with international wholly owned subsidiaries contributed to the longevity of international joint ventures, but prior experience with international joint ventures did not.

International joint ventures have become a prevalent mode of entry into global markets (Berg, Duncan, & Friedman, 1982; Harrigan, 1985; Hergert & Morris, 1988; Wysocki, 1990). Publications on the topic mostly focus on the motivations behind international joint venture formation (Buckley & Casson, 1988; Contractor & Lorange, 1988; Harrigan, 1985; Hennart, 1988; Hergert & Morris, 1988; Kogut, 1988) and the conditions encouraging it (Agarwal & Ramaswami, 1992; Gatignon & Anderson, 1988; Gomes-Casseres, 1989; Hennart, 1991; Madhok, 1997; Stopford & Wells, 1972). Little has been done, however, to identify the factors that underlie success and failure in such ventures; this is a remarkable omission, given their high failure rate (Chowdhury, 1992; Gomes-Casseres, 1987; Hill & Hellriegel, 1994; Levine & Byrne, 1986). To the extent that international joint venture failure is studied, explanations have been confined to one area, namely, lack of the skills needed to manage affiliates dispersed in unfamiliar foreign environments (Buckley & Casson, 1988). To be successful in operating joint undertakings, however, firms also need to master sharing ownership with a partner whose interests only partially overlap with their own (Shenkar & Zeira, 1987).

The present research examined the two sets of skills within an evolutionary perspective, to explain how firms learn to handle international joint ventures. Hypotheses were derived from organizational learning theory (Cohen & Levinthal, 1990; Cyert & March, 1963) to indicate learning stemming from experience with international wholly owned subsidiaries, with domestic joint ventures, and with previous international joint ventures. Data on 1,493 domestic and international expansions of 25 Dutch multinationals from 1966 to 1994 allowed for a longitudinal examination of learning paths and their implications for international joint venture longevity.

THEORY AND HYPOTHESES

According to organizational learning theory, prior learning facilitates the learning and application of new, related knowledge (Cohen & Levinthal, 1989, 1990, 1994). This idea can be extended to include the case in which the knowledge in question is itself a set of learning skills constituting a firm's absorptive capacity. This capacity increases incrementally as a function of the previous experience of the firm and its learning processes. In the foreign entry literature, advocates of the internationalization process school, or the Uppsala stage model (Johanson & Vahlne, 1977), have argued that firms expand slowly from their domestic bases into progressively distant areas. Experiential learning from previous entries is the driving force behind new investments (Barkema, Bell, & Pennings, 1996; Davidson, 1983; Denis & Depelteau, 1985; Johanson & Wiedersheim-Paul, 1975; Luostarinen, 1980). The internationalization process approach focuses, however, on the early steps in the internationalization process, ignoring the investment mode chosen (Kogut & Singh, 1988).

To successfully cross national boundaries, a firm must develop information processing and control capabilities so as to coordinate activities across diverse environments, and it must develop the skills of tuning into and interpreting strategic signals specific to a foreign environment. In this process, firms unlearn practices typical of their home countries (cf. Bettis & Prahalad, 1995; Hedberg, 1981; Lewin, 1947; McGill & Slocum, 1993; Prahalad & Bettis, 1986).

The complexities of working abroad are encountered not only in international joint ventures, but also in international wholly owned subsidiaries. Such subsidiaries offer firms the opportunity to learn to operate in a foreign environment incrementally, without having to simultaneously adapt to a foreign partner, thus facilitating an effective learning experience allowing for later success. Hence,

> *Hypothesis 1. The longevity of an international joint venture increases with the international wholly owned subsidiary experience of the firm investing abroad.*

One key challenge for firms operating abroad is bridging the distance to the host culture. Cultural distance has been defined as "the sum of factors creating, on the one hand, a need for knowledge, and on the other hand,

barriers to knowledge flow and hence also for other flows between the home and the target countries" (Luostarinen, 1980: 131–132). It has often been cited as a factor in firms' choice of less committed entry modes (Root, 1987), specifically, their preference for joint ventures over wholly owned subsidiaries (e.g. Agarwal, 1994; Bell, 1996; Bell, Barkema, & Verbeke, 1997; Cho & Padmanabhan, 1995; Erramilli, 1991; Erramilli & Rao, 1993; Kogut & Singh, 1988; Larimo, 1993; Padmanabhan & Cho, 1996). Anderson and Gatignon (1986) noted that cultural distance caused foreign investors to avoid full ownership because distance increases information costs and difficulty in transferring management skills (Buckley & Casson, 1976; Vachani, 1991). Cultural distance adversely affects international joint ventures by eroding the applicability of the parent's competencies (Johanson & Vahlne, 1977; cf. Brown, Rugman, & Verbeke, 1989; Chowdhury, 1992; Gomes-Casseres, 1989; Harrigan, 1985, 1988; Hergert & Morris, 1988; Lorange & Roos, 1991; Parkhe, 1991). Woodcock and Geringer (1991) argued that cultural differences produce inefficient principal-agent contracts. and Li and Guisinger (1991) found that U.S. affiliates whose partners came from culturally dissimilar countries were more likely to fail. Thus,

> *Hypothesis 2. The longevity of an international joint venture decreases with the cultural distance between the country of the firm investing abroad and the host country.*

The need to select a partner and to cooperate and share control with the partner is a major source of complexity in joint ventures. Schaan and Beamish (1988) described the "subtle balancing act" that operating joint ventures requires. Officers at Otis, a company whose foreign venturing dates back to the 19th century, consider their firm's ability to quickly select partners and work effectively with them to be a key competitive advantage (Ingrassia, Naji, & Rosett, 1995). According to the chairman of Corning Glass, partnering skills include "the ability to cope with the constant compromise and give-and-take that successful joint ventures require" and the ability, when necessary, to "sit back and let someone else be in the driver's seat" (Mitchell, 1988). The capacity to work with others can be learned, however, not only from previous international joint ventures, but also from previous domestic joint ventures.

That knowledge relevant to the operation of international joint ventures can be gained from domestic joint ventures is a crucial yet neglected possibility. Since the international joint venture literature is largely a product of the broader domain of international business, such ventures have been juxtaposed with other forms of foreign direct investment but not with their domestic counterparts. Yet the two joint venture types have much in common in that both facilitate the learning of partnering skills. Furthermore, domestic venturing allows a firm to learn how to cooperate without simultaneously having to deal with the complexity of a foreign environment. Thus, domestic joint ventures, like international wholly owned subsidiaries, can be a stepping stone from which to launch international joint ventures. Hence,

> *Hypothesis 3. The longevity of an international joint venture increases with the previous domestic joint venture experience of the partner investing abroad.*

That firms learn about international joint ventures from their previous experience with such ventures seems compelling—the experience entails exposure to both international and partnership activities. International joint venture experience has been found to increase firms' propensity to set up new ventures (Madhok, 1997), to improve their understanding of this vehicle (Lyles, 1987, 1988), and to enhance the performance of the investing firms (Mitchell, Shaver, & Yeung, 1994) and of the investment vehicles themselves (Li, 1995). An incremental approach implies, however, that learning both partnership and boundary-crossing skills at the same time may be a task that exceeds the absorptive capacity of naive entrants who lack both types of skills. Still, we offer the following hypothesis:

> *Hypothesis 4. The longevity of an international joint venture increases with the previous international joint venture experience of the firm investing abroad.*

METHODS

Sample

Hypotheses were tested on data on all expansions reported in the annual reports of a sample of Dutch firms between 1966 and 1994. This sample comprised the 25 largest[1] Dutch companies but excluded the 4 largest (Royal Dutch, Unilever, Philips, and Akzo), which are a distinctive group in terms of their breadth of activities, international experience, scope, and size. Totals of national and international expansions during the period were 596 and 897, respectively. Of the international expansions, 244 were joint ventures.

Variables

Longevity. Following earlier research (Barkema et al., 1996; Carroll, Preisendorfer, Swaminathan, & Wiedermayer, 1993; Carroll & Swaminathan, 1991; Chowdhury, 1992; Li, 1995; Pennings, Barkema, & Douma, 1994), we used longevity as the independent variable. Although it is not a perfect performance measure, previous studies have shown that longevity provides the best estimate of managers' perceptions of the success of an expansion (Geringer & Hebert, 1991) and that it correlates with financial performance (Mitchell et al., 1994). Longevity was defined as the number of years a venture persisted.[2]

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[1] In terms of firm value, these were the largest firms listed in 1994 on the Amsterdam Stock Exchange.

[2] Executives of a subset of 5 firms were asked to rate the success of the international joint ventures in our data set ($N = 31$) on a seven-point scale. Like Geringer and Hebert (1991), we calculated the Spearman correlation between the longevity of these international joint ventures and their success as perceived by the managers. The correlation coefficient was .55 ($p < .001$), a value comparable to that of the coefficient found by Geringer and Hebert (.46). In addition, we found that only one of the ventures was planned to be short-lived from the start.

Cultural distance. Cultural distance to the host country from the Netherlands was measured with Kogut and Singh's (1988) index. This index is an aggregate of the four dimensions of culture outlined in Hofstede (1980), and has been used often in studies of foreign entry (Agarwal & Ramaswami, 1992; Benito & Gripsrud, 1992; Cho & Padmanabhan, 1995).[3] Cultural difference scores unavailable from Hofstede's published work (1980, 1991) were obtained via personal communication with that author.

Experience. Experience with each of four types of affiliation—international joint venture, domestic joint venture, international wholly owned subsidiary, and domestic wholly owned subsidiary—was measured as the number of previous such affiliates a firm had had by the time of a new affiliate's founding.

Control variables. To mitigate potential omitted-variable problems, we controlled for experience with domestic wholly owned subsidiaries.[4] In addition, the following time-variant control variables were used: The logarithm of the assets of a firm in the year of an international joint venture's founding served as a proxy for firm size. The return on equity of the firm in that year was used as a proxy for firm profitability. We also controlled for the gross national product per capita of the host countries. Table 1 presents summary statistics on these and other variables.

Analysis

Analysis was done with LIFEREG, an event-history analysis method (SAS Institute, 1988). The model used is based on an assumed accelerated failure-time with a Weibull distribution. The analysis entailed the exploration of whether the hazard rate of ventures (the converse of the survival rate) varies with the amount and type of a firm's experience. For example, a negative coefficient associated with domestic joint venture experience implies that international joint ventures dissolve more slowly if the firm investing abroad has previous experience with domestic joint ventures.

RESULTS

Hypotheses 1 and 3 predict that international joint venture longevity increases with the experience of the firm that is investing abroad with international wholly owned subsidiaries and domestic joint ventures, respectively. Table 2 (model 1) shows that both effects are in the expected direction.

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[3] The Kogut and Singh (1988) index of cultural distance is an arithmetic average of the deviations of each country from the index of the Netherlands along Hofstede's (1980) four cultural dimensions. Algebraically, it is calculated as $CD_j = \sum_{i=1,2,3,4} [(I_{ij} - I_{in})^2 / V_i]/4$, where CD_j = the cultural distance of the jth country from the Netherlands, I_{ij} = the index for the ith cultural dimension and jth country, n = the Netherlands, and V_i = the variance of the index of the ith dimension.

[4] Firms may also benefit from other sorts of experience when launching international joint ventures—from exporting, for example—but such data were not available. If firms learn from exporting, the effects measured in this study may overestimate the effects of learning from previous international expansions on the longevity of international joint ventures.

TABLE 1
Means, Standard Deviations, and Correlations[a]

Variable	Mean	s.d.	1	2	3	4	5	6	7
1. International joint venture experience	7.15	6.29							
2. Domestic joint venture experience	3.52	4.67	.25						
3. International wholly owned subsidiary experience	13.05	12.61	.50	.34					
4. Domestic wholly owned subsidiary experience	10.79	10.35	.23	.42	.60				
5. Cultural distance	3.04	1.25	.09	.06	.07	−.12			
6. Assets[b]	13.65	1.27	.50	.57	.15	.27	−.05		
7. Return on equity	0.11	0.12	−.20	−.17	.20	.28	−.01	−.23	
8. Gross national product	8.52	6.00	−.03	.21	.18	.37	−.27	.17	.14

[a] $N = 244$. Correlations with absolute values greater than .13 are significant at $p < .05$.
[b] Value is a logarithm.

The effects of both international wholly owned subsidiary experience and domestic joint venture experience are significant ($p < .05$ and $p < .10$, respectively). Since we predicted that experience with either international wholly owned subsidiaries or domestic joint ventures could be used as a stepping stone to success with international joint ventures, we also tested a version of the model that included the interaction between international wholly owned experience and domestic joint venture experience (see model 2). If either type of experience can be used as a stepping stone, a firm that already has experience with domestic joint ventures should benefit less from experience with international wholly owned subsidiaries, and vice versa. This observation implies that the interaction term (capturing firms' having both types of experience) and the two main effects should have opposite signs. The interaction term is indeed positive and significant ($p < .01$). The main effects of international wholly owned subsidiaries and domestic joint ventures become more significant in this model ($p < .001$) than they were in model 1. Support for the hypotheses strengthens when the incremental nature of learning (that either type of experience can serve as a stepping stone) is recognized in the model.

Hypothesis 2 predicts that international joint venture longevity decreases with the cultural distance between foreign investor and host country. The results contained in model 1 show that the effect of cultural distance is significant and in the expected direction ($p < .05$).

Hypothesis 4, predicting that firms benefit from previous international joint ventures when launching new ones, was not supported (see Table 2). Apparently, the firms in our sample did not learn from their previous international joint venture experience.

TABLE 2
Results of Event-History Analysis for Types of Experience[a]

Independent Variables	Model 1	Model 2
Intercept	0.87	0.59
	(1.15)	(1.22)
International joint venture experience	0.01	0.03
	(0.03)	(0.03)
Domestic joint venture experience	−0.05†	−0.19***
	(0.03)	(0.06)
International wholly owned subsidiary experience	−0.03*	−0.06***
	(0.02)	(0.02)
Domestic wholly owned subsidiary experience	0.01	−0.00
	(0.01)	(0.01)
Domestic joint venture × international wholly owned subsidiary experience		0.01**
		(0.00)
Cultural distance	0.12*	0.13*
	(0.07)	(0.07)
Assets[b]	0.14	0.18†
	(0.09)	(0.09)
Return on equity	1.55†	1.15
	(0.86)	(0.86)
Gross national product per capita	−0.01	−0.01
	(0.01)	(0.02)
Log likelihood	−195	−191

[a] Numbers in parentheses are standard deviations.
[b] Value is a logarithm.
† $p < .10$
* $p < .05$
** $p < .01$
*** $p < .001$

Product Diversification as a Moderator

A key notion underlying this research is that firms can only absorb experience if it relates to what they already know (Cohen & Levinthal, 1990). International expansion paths need to be incremental to allow firms to interpret new experience and to foster learning. This statement suggests that a firm learns from experience with international wholly owned subsidiaries and with domestic joint ventures if the experience is related to the firm's knowledge base—if it is acquired in the same line of business as the firm's principal business (constituting horizontal expansion), or in a related line of business (related expansion), or up or down the value chain (vertical expansion). In contrast, expansion into an unrelated line of business may trigger information overload and make it difficult for a firm's key managers to interpret the experience and benefit from it when entering international joint ventures later.

The sampled firms' expansion experience was thus separated into (1) horizontal, related, and vertical expansions (cf. Pennings et al., 1994) and

(2) unrelated expansions. Table 3 presents the estimation results, which show significant effects for both experience with international wholly owned subsidiaries and experience with domestic joint ventures in related businesses. The effects of previous experience in unrelated businesses are insignificant. The results are again consistent with an incremental learning approach.

Sensitivity Analysis

Firm-specific effects. In view of Hitt, Harrison, Ireland, and Best's (1995) findings for mergers and acquisitions, we also considered learning effects at

TABLE 3
Results of Event-History Analysis with Product Diversification
as Moderator[a]

Independent Variables	Model 3
Intercept	0.46
	(1.37)
Unrelated international joint venture experience	0.02
	(0.09)
Related international joint venture experience	0.03
	(0.04)
Unrelated domestic joint venture experience	−0.13
	(0.13)
Related domestic joint venture experience	−0.20*
	(0.09)
Unrelated international wholly owned subsidiary experience	−0.07
	(0.12)
Related international wholly owned subsidiary experience	−0.05*
	(0.03)
Domestic wholly owned subsidiary experience	−0.00
	(0.01)
Unrelated domestic joint venture × international wholly owned subsidiary experience	−0.03
	(0.12)
Unrelated domestic joint venture × related international wholly owned subsidiary experience	0.00
	(0.01)
Related domestic joint venture × unrelated international wholly owned subsidiary experience	0.04
	(0.09)
Related domestic joint venture × related international wholly owned subsidiary experience	0.02*
	(0.01)
Cultural distance	0.13*
	(0.07)
Assets[b]	0.18
	(0.10)
Return on equity	1.77
	(1.07)
Gross national product per capita	−0.01
	(0.02)
Log likelihood	−188

[a] Numbers in parentheses are standard deviations.
[b] Value is a logarithm.
* $p < .05$

the individual firm level, using models with interactions between learning effects and dummy variables for firm. This procedure captured firm-specific learning gained from previous types of affiliation and applied to new international joint ventures. Not all 25 firms had engaged in all the affiliate types studied, so fewer than 25 interaction terms resulted for each type of learning effect. In addition, some interaction terms had to be removed from the models for reasons of multicollinearity. There remained 17 firm-specific effects of previous international wholly owned subsidiaries, 13 firm-specific effects of previous domestic joint ventures, and 16 firm-specific effects of previous international joint ventures. Of these effects, 11, 10, and 5, respectively, were significant and in the expected direction, mostly at the $p < .001$ level. The results suggest that most firms learned about international joint ventures from international wholly owned subsidiaries or domestic joint ventures and that some firms also learned from previous international joint ventures. A subsequent analysis suggested that firms did not learn from previous international joint ventures unless the latter experience was preceded by experience with either domestic joint ventures or with international wholly owned subsidiaries.[5] Finally, an exploratory analysis suggested that firms learned from failures rather than successes with international wholly owned subsidiaries, but this result was not obtained for domestic joint venture experience.

Shape of experience curves. To examine learning theory's assertion regarding decreasing marginal returns from experience (Yelle, 1979), we added quadratic terms of the experience variables to the linear effects. The quadratic effects were insignificant. We also estimated models that separated the experience with international wholly owned subsidiaries into two categories, experience with fewer than 10 international wholly owned subsidiaries, and experience with more than 10. We also estimated similar models for two categories of domestic joint venture experience and international joint venture experience, respectively. The analyses did not support the notion of decreasing returns to learning.[6] Learning about international joint ventures may be so complex that the experience curve had not leveled off yet for the firms studied, which were in their early decades of international expansion.

Hofstede's dimensions. Culture is a complex phenomenon that embodies a host of values, beliefs, and norms, many of which are subtle, intangible, and difficult to measure. Interpretation of culture as a unidimensional, aggregate phenomenon, although popular in the foreign entry literature (e.g., Agarwal & Ramaswami, 1992), oversimplifies a complex construct (Shenkar & Zeira, 1992) and may explain the mixed results studies have yielded regarding the

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[5] We found no significant learning effects of previous international joint ventures that were not preceded by international wholly owned subsidiaries or domestic joint ventures. Exploratory analysis revealed a significant learning effect of international joint ventures preceded by at least 10 domestic joint ventures or 30 international wholly owned subsidiaries. The effect remained if firm dummies were added to the analysis.

[6] Similar conclusions were reached for other cut-off rates, for instance, for 5 and for 20 ventures.

impact of cultural distance on foreign expansion (Benito & Gripsrud, 1992; Kogut & Singh, 1988; Madhok, 1997; Padmanabhan & Cho, 1996).

To take account of this complexity, we did some further analysis regarding Hofstede's conjectures about the different impacts of gaps between two cultures along his four dimensions. Hofstede (1989) suggested that although some cultural gaps were not very disruptive or were even complementary, differences between two cultures in uncertainty avoidance were potentially very problematic for international cooperation because of correlated differences in tolerance toward risk, formalization, and the like. An uncertainty avoidance gap is likely to be detrimental to international joint venture operation because uncertainty is an inherent characteristic of operating in a foreign environment and because such a gap implies contrasting expectations regarding the predictability of partner behavior, also a key issue in international joint ventures. Indeed, the results show a significant effect for uncertainty avoidance (0.19, $p < .01$) but not for the other dimensions.[7]

Developed versus developing countries. Experience with international wholly owned subsidiaries in developed countries may be less useful when applied to joint ventures in developing countries, and vice versa. Hence, experience with international wholly owned subsidiaries was separated into experience in developed countries (Ronen and Shenkar's [1985] Nordic, Germanic, Anglo, and Latin European blocs) and in developing countries (the remaining Ronen and Shenkar blocs; see Table 4). The dummy variable "developed country" in Table 4 captures whether an international joint venture was in a developed country (or not), and the dummy variable "developing country" captures the opposite.

The results presented in Table 4 show that international joint ventures in developed countries benefit significantly from the experience of the firms investing abroad (the Dutch firms) with international wholly owned subsidiaries in developed countries, but not from such firms' previous ventures in developing countries. Similarly, international joint ventures in developing countries benefit significantly from investor's previous experience with international wholly owned subsidiaries in developing countries, but not from experience with such subsidiaries in developed countries.

Another interesting result given in Table 4 is that the effect of cultural distance is significant for international joint ventures in developing countries, but not for international joint ventures in developed countries. To get a sharper view of the effects of cultural differences between the foreign and host country on the longevity of international joint ventures in developed countries, we replaced the cultural distance variable (per Hofstede) for developed countries with dummy variables representing Ronen and Shenkar's blocs, making the Nordic bloc (to which the Netherlands belongs) the omitted

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[7] No effects were found for the power distance and masculinity/femininity dimensions. The effect of individualism became significant if gross national product per capita was deleted from the model as a control variable.

TABLE 4
Results of Event-History Analysis for Developed/Developing Countries[a]

Independent Variables	Model 4
Intercept	1.71
	(1.31)
International joint venture experience	0.05
	(0.04)
Domestic joint venture experience	−0.15**
	(0.06)
Developed international wholly owned subsidiary experience × developed country	−0.07**
	(0.02)
Developed international wholly owned subsidiary experience × developing country	−0.01
	(0.03)
Developing international wholly owned subsidiary experience × developed country	−0.02
	(0.12)
Developing international wholly owned subsidiary experience × developing country	−0.11***
	(0.03)
Domestic wholly owned subsidiary experience	−0.01
	(0.01)
Domestic joint venture × international wholly owned subsidiary experience	0.01*
	(0.01)
Cultural distance × developed country	0.03
	(0.11)
Cultural distance × developing country	0.14*
	(0.07)
Assets[b]	0.08
	(0.10)
Return on equity	2.09*
	(1.05)
Gross national product per capita	0.01
	(0.02)
Log likelihood	−183

$* \ p < .05$
$** \ p < .01$
$*** \ p < .001$
[a] Numbers in parentheses are standard deviations.
[b] Value is a logarithm.

category.[8] The results showed significant effects for the Germanic, Anglo, and Latin European dummies (1.46, $p < .05$, 1.67, $p < .05$, and 1.55, $p < .05$, respectively), suggesting that joint ventures of Dutch companies with partners in the three latter blocks encountered more problems than Dutch ventures with partners from other Nordic block countries. Using any of the other three dummies (Germanic, Anglo, or Latin European) as the omitted

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[8] The Ronen and Shenkar (1985) cultural blocs are based on a synthesis of eight clustering studies, including Hofstede (1980). The clustering represents the similarity of national cultures and transcends the explicit dimensions making up that complex construct.

category did not result in significant effects for the other two, suggesting that the magnitude of cultural problems did not vary significantly across these three cultural blocs.[9]

Further analyses. In further analyses, a number of control variables were added, including a time-variant measure of firm diversification (capturing the level of diversification for each firm for each year) and the level of diversification implied by the international joint venture (coded 1 for related, horizontal, or vertical diversification and 0 otherwise). These analyses did not lead to different conclusions. We also separated previous experience with international wholly owned subsidiaries into experience with start-ups and experience with acquisitions and obtained virtually identical results for both. Finally, we repeated all the analyses using distributions other than the Weibull distribution that underpins the above results, including gamma, logarithmic logistic, and logarithmic normal distributions. All the results were equally supportive.

DISCUSSION

The findings of the present study expand earlier findings illustrating the incremental nature of firms' learning of new technologies (Cohen & Levinthal, 1990), across industries (Chang, 1995; Pennings et al., 1994; Ramanujam & Varadarajan, 1989), and beyond national borders (Barkema et al., 1996; Johanson & Vahlne, 1977; Johanson & Wiedersheim-Paul, 1975). Specifically, this study identifies both experience with domestic joint ventures and experience with international wholly owned subsidiaries as stepping stones from which operation of international joint ventures can be successfully launched—as long as the experience is related to a firm's core business. Domestic joint ventures allow firms to learn about partnering without having to simultaneously handle the vagaries of foreign settings. International wholly owned subsidiaries allow firms to learn how to operate in foreign settings without the complexities of cooperating with a partner, provided the experience is accumulated in the same context—that is, in developed countries if the new expansion is into a developed country, and in developing countries if the new expansion is into a developing country. And, in line with previous conjectures (e.g., Hofstede, 1989), international joint venture longevity decreased with the cultural distance between a Dutch investor and a host country.

The significant role played by domestic joint ventures in preparing firms for cross-border joint ventures is especially noteworthy and represents a unique contribution of this research. In addition to pinpointing a crucial, yet neglected, way of learning to successfully operate international joint ventures,

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[9] Not surprisingly, estimation results from the full model with dummies for all Ronen and Shenkar blocs (Germanic, Anglo, Latin European, Latin American, Far Eastern, African, etc., with Nordic as the omitted category) tested on the whole data set showed highly significant effects of the bloc dummies associated with non-European cultures.

this finding has implications for the learning process in international business. The finding confirms that an analysis of a multinational corporation's operations abroad should also include paths from its domestic activities, and that international business research should not be rigidly confined to nondomestic operations.

If one accepts the premise that the national culture of a multinational corporation can moderate its ability to learn to cooperate with others and to adapt to foreign settings (Hickson, 1996; Hofstede, 1983), the present study—which was limited to Dutch multinationals—should be replicated for firms rooted in other national settings. Given our confirmation of the importance of uncertainty avoidance (Hofstede, 1989), it would be interesting to compare the findings for the Netherlands, a country with low uncertainty avoidance, with results for a country with high uncertainty avoidance, such as Japan. Similarly, given the prominence of the Netherlands as a foreign investor, multinational corporations from developing and newly industrialized economies would make a valuable base for comparison.

The above strategies, combined with the broadening of potential learning paths to include trading activities as well as mergers and acquisitions, will go a long way toward enhancing scholars' understanding of the foreign investment learning process. This understanding will not be complete, however, without injecting the internal processes that are part and parcel of the learning process. The present findings suggest that most, but not all, firms benefit from their experience with domestic joint ventures and international wholly owned subsidiaries when entering international joint ventures. To understand why, researchers should examine the structural and process factors facilitating learning in alliances (cf. Hitt et al., 1995), as well as the customized channels allowing for the creation and transfer of knowledge within multinational corporations (cf. Bartlett & Ghoshal, 1989; Hedlund, 1994).

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THE EFFECTS OF PARTNER AND RELATIONSHIP CHARACTERISTICS ON ALLIANCE OUTCOMES

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Theories of alliance behavior and outcomes have tended to emphasize either partner or relationship characteristics. This study integrates the two perspectives and examines their separate and combined effects on alliance outcomes. The research involved analysis of 98 alliances through a two-stage survey design. Findings support a positive relationship between partner firms' benefits from alliance participation and partner reputation, shared decision making, and strategic similarities between partners.

Alliances have become an important research topic covering a range of theoretical bases and perspectives (Baum & Oliver, 1991; Chowdhury, 1992; Hagedoorn, 1993; Harrigan, 1985, 1995; Kent, 1991; Kogut, 1988; Miner, Amburgey, & Stearns, 1990; Osborn & Baughn, 1990). Previous alliance research has progressed along two main paths. First, some researchers have focused on *partner characteristics* as an explanation for alliance behavior and outcomes. Resource exchange and the value of the resource accessed in an alliance are of central concern (Harrigan, 1986; Pfeffer & Nowack, 1976; Pfeffer & Salancik, 1978; Thorelli, 1986). Researchers articulating this perspective view alliances and networks as alternative mechanisms to markets or hierarchies for addressing specific strategic needs. In this tradition, alliances are undertaken to secure scarce and valuable resources critical for a firm's survival and prosperity.

Other researchers have focused on the interactive nature of cooperation between organizations (Cook, 1977; Gulati, 1995a; Heide & Miner, 1992; Levinthal & Fichman, 1988; Ring & Van de Ven, 1994). Here, the link between the firms is the focus of the analysis. Rather than viewing each alliance as

a separate transaction, researchers in this tradition emphasize the importance of positioning a transaction in the context of the ongoing relationship between the firms involved. A history of trust (Parkhe, 1993a) and the prior relationship between the firms engaged in a relationship (Gulati, 1995b; Levinthal & Fichman, 1988) influence the willingness to "partner." It is not the resource per se, but the social network of relationships in which a firm is embedded, that leads to partnering (Shrum & Wuthnow, 1988). According to this perspective, it is the characteristics of the relationship between the firms as an ongoing pattern that should be the focal point for understanding alliance behavior and outcomes.

As a whole, this research has left two important questions unanswered. First, researchers have tended to rely on one or the other of the two approaches, and partner and relationship characteristics have not been integrated in prior studies. Traditional economic theories emphasizing a rational approach to profit or resource maximization consistent with the partner focus tend to "undersocialize" (Granovetter, 1985) complex relationships between market actors. This approach results in a static model of efficiency (Nooteboom, 1992) in which the importance of relationships is ignored. A dynamic model of interaction that goes beyond traditional transaction cost analysis will more completely capture the dynamic efficiency characterizing these relationships (Hill, 1990; Nooteboom, 1992). However, models that focus only on relationships may describe phenomena as chiefly social (Granovetter, 1985) and ignore the costs of long-standing relationships that lack infusions of new ideas and capabilities (March, 1991). A balanced approach would suggest that alliance behavior is a function of the combined economic value of a resource per se and the likelihood that a satisfactory relationship will be formed in a social structure.

Second, there has been a lack of empirical attention to the impact of these characteristics on alliance outcomes. The authors of recent review articles in management (Smith, Carroll, & Ashford, 1995) and marketing (Varadarajan & Cunningham, 1995) reached the same conclusion: Scholars know little about the underlying causes of successful alliances. What is lacking is systematic analysis within a sample of alliances of the factors associated with those that are more satisfactory and beneficial to partner firms.

This study incorporates both economic traditions emphasizing the value of a resource per se and behavioral traditions emphasizing the relationships in which a firm is embedded to develop a more complete understanding of the factors affecting alliance outcomes. The contribution is the integration of these perspectives and empirical testing of their separate and combined effects on alliance outcomes through a longitudinal study.

HYPOTHESES

Partner Characteristic: Reputation

A number of theories of the firm, including resource-based, resource dependence, transaction costs, agency, and game theories, recognize the

importance of reputation for organizations (Brown & Perry, 1994; Fombrun & Shanley, 1990; Fryxell & Wang, 1994). Reputation can reflect an alliance partner's characteristics in the areas of management, product quality, and financial position (Dollinger, Golden, & Saxton, 1997). According to the resource-based theory, a positive reputation is a valuable intangible asset that may allow a firm to establish a sustainable competitive advantage (Barney, 1991; Hall, 1992). Proponents of a related perspective, resource dependence, argue that a positive reputation allows a firm better access to scarce resources (Pfeffer & Salancik, 1978; Wernerfelt, 1984). Reputation is, then, both an internal resource and a means to secure external resources.

According to transaction cost and agency theories, a positive reputation can reduce the search and monitoring costs associated with allying with a specific company, thereby lowering the overall transaction costs involved (Weigelt & Camerer, 1988; Williamson, 1975). A positive reputation can lessen fears of "moral hazard" and "adverse selection" by acting as a surrogate for direct experience with a partner. In the cost-benefit analysis, then, a firm can justify avoiding the costs of internalization by lowering the transaction costs associated with partnering with a reputable entity. Similarly, in game theory, the primary source of information as to the propensity of a partner to defect is the target's reputation (Weigelt & Camerer, 1988). A positive reputation is an indication that the target will not defect and collect the payoff from the interaction (for a more complete discussion, see Parkhe [1993a]).

Whether a relationship has a single episode or is infinite in duration, theory suggests that reputation is an important factor in alliance success (Granovetter, 1985; Hill, 1990). Asset specificity alone will not explain firm behavior, because firms exist in a system of markets beyond each individual transaction (Hill, 1990). Although empirical evidence is lacking, an underlying assumption in these arguments is that firms in an alliance believe a partner's positive reputation enhances the potential for a satisfactory relationship with that firm. The benefits of a positive reputation would be expected to continue beyond the completion of the transaction and enhance the chances for satisfaction throughout the life of the relationship. If this were not the case, a positive reputation would not be a desirable feature of a partner firm. Reputation has value to a potential partner as a signal of the worth of both a firm and the asset obtained via an alliance. In addition, a positive reputation signals that a partner is trustworthy and decreases the perceived likelihood that the partner will defect. Thus,

> *Hypothesis 1. Partner reputation will be positively related to alliance outcomes.*

Characteristics of Relationships

Prior affiliation. Recent empirical work examining alliance dynamics links the extent to which firms have a prior relationship to the trust between partners, the propensity to continue to engage with that firm, and the struc-

tural mechanisms used to control behavior (Gulati, 1995a; Levinthal & Fichman, 1988; Parkhe, 1993a). This work is rooted in the observation that trust and knowledge of a partner's reliability and corresponding lack of propensity to behave opportunistically come from repeated interaction (Rempel, Holmes, & Zanna, 1985). Parkhe (1993a), for example, found that a cooperative history in alliances was negatively related to perceptions of opportunistic behavior on the part of the partner. Levinthal and Fichman (1988) likewise found that the duration of a prior relationship and the likelihood of dissolution following the "honeymoon period" were negatively related in auditor-client interactions. In a similar vein, Gulati (1995a) used prior relationship as a proxy for trust and found that having a prior relationship made firms less likely to choose equity as a governance mechanism in R&D-based alliances. Prior affiliation, then, influences a firm's propensity to align itself with a particular partner.

Prior affiliation has not yet been specifically linked to satisfaction with the outcome of an alliance. I suggest that former relationships between firms should likewise affect alliance success. Killing (1983) noted the importance of having or establishing a close relationship with any joint venture partner. He attributed the success of a joint venture to the intimate knowledge gained by each partner about the other prior to the transaction. Affiliation, broadly defined as prior market contact, could therefore have several benefits. First, it allows a firm to know a partner better. Presumably, this knowledge allows the firm to better understand the capabilities or resources it is accessing and the partner's likely behavior. In addition, prior affiliation should build trust between partners and a mutual understanding of how the companies work together. Thus,

> *Hypothesis 2. A prior relationship will be positively related to alliance outcomes.*

Shared decision making. Prior research has also found that the degree to which partners trust each other and are committed to a relationship is a result of their investment and involvement in that relationship (Parkhe, 1993a). Game theory suggests that investment signifies commitment to an alliance, implying good faith and trust (Parkhe, 1993a). Further, close interaction offers opportunities for the partners to develop mutual forbearance. The close interaction and the investment partners make through shared decision making signify two things: (1) a commitment to and interest in outcomes, which decrease the perceived likelihood of opportunistic behavior and (2) the likelihood that a partner's opportunistic behavior will be recognized. Information asymmetry is thereby reduced when both partners have high participation in and knowledge of strategic decisions and actions. Thus, a high level of mutual involvement acts as both a signaling and a monitoring mechanism by establishing and building trust and commitment.

Organizational learning theory suggests that firms seek to establish and maintain competitive advantage through acquiring tacit, or nonverbalized, as well as articulated (or verbalized) knowledge (Hedlund, 1994). Organizations

must learn as part of adaptive behavior to be able to respond to environmental demands (Cyert & March, 1963; Fiol & Lyles, 1985; Levitt & March, 1988). Interorganizational activities, including alliances and acquisitions, are one mechanism firms use to learn (Lyles, 1988; Pennings, Barkema, & Douma, 1994). Building on Piaget's ideas about human learning, Nooteboom (1992) suggested that companies change ideas and even establish their identity through interaction with other firms and that closer bonds and reciprocation in relationships facilitate succcessful innovation. From an organizational learning perspective, the ability to appropriate the knowledge resident in a partner requires close involvement in an alliance and its decision-making processes. For these reasons, a high degree of mutual involvement in the strategic decision making of the alliance will positively affect outcomes as such involvement builds trust and enhances the appropriability of knowledge.

> *Hypothesis 3. Shared decision making will be positively related to alliance outcomes.*

Similarities between partners. One dimension of an alliance relationship that has received limited empirical attention is the extent to which a firm's capabilities and processes are similar or related to those of its alliance partner (Hull, Slovinsky, Wharton, & Azimi, 1988; Westney, 1988). This concept has been developed in the literature on diversification (Chandler, 1962; Porter, 1987; Rumelt, 1974). These studies and others have demonstrated that unrelated diversification results in less successful expansion efforts. A company cannot successfully manage businesses it does not understand. In related acquisition research, Jemison and Sitkin (1986) introduced the concept of "organizational fit" and the importance of a company's understanding the fit with an acquisition prospect before completing a deal. These authors argued that strategic fit, or similarities between organizations in terms of technology, products, and markets, should be distinct from organizational fit, or similarities between organizations in terms of organizational processes, such as culture, human resource policies, and administrative systems. In order to enjoy expected synergies, organizations must have similar cultures and approaches to strategic decisions (i.e., organizational fit). Fit, then, determines the extent to which organizations can get along and realize anticipated synergies critical to a transaction's success.

Pennings and colleagues (1994) noted the importance of testing the findings from diversification research in an alliance context. In alliances, a good fit should yield a number of benefits. It may enable an initiator to more readily identify and appreciate the potential contribution of a partner and to therefore select a company with which a combination is likely to be fruitful. Organizational learning theory suggests that similarities between partners may affect alliance performance because they facilitate the appropriability of tacit and articulated knowledge (Hedlund, 1994; Teece, 1977). For an organization to effectively capture the potential learning embedded in an alliance relationship, it needs to have a common frame of reference. Thus, similarities between partners help establish trust and also enhance the appro-

priability of knowledge, in turn increasing the likelihood of a successful alliance.

> *Hypothesis 4. Similarities between partners will be positively related to alliance outcomes.*

METHODS

This study employed a two-stage, longitudinal field survey design to address some criticisms of single-shot cross-sectional research (cf. Harrigan, 1983). I gathered data on 120 alliances in 1994 to measure pretransaction variables (target reputation, prior relationship, and similarities between targets) and initial satisfaction in the first year of each alliance. I gathered data on 137 alliances in mid-1995 to assess alliance outcomes and the degree of shared decision making. In total, 98 alliance partners provided data in both rounds of surveys. This longitudinal design minimizes potential confounds due to common methods variance (Podsakoff & Organ, 1986) by separating measurement of independent variables subject to retrospective bias (Golden, 1992) and implicit theory (Smither, Collins, & Buda, 1989) from measurement of alliance success.

Sample

The final sample included 98 partner contacts out of a possible 286, for a final response rate of 34 percent. Since the independent variables were measured in 1994, only alliances formed in 1993 were included in the sample. In terms of industry scope, I focused on one Standard Industrial Classification code (SIC 28, chemicals and allied products) to balance control of environmental factors and understanding of contextual factors with external validity or generalizability of the findings. Firms from eight countries—Canada, the United States, the United Kingdom, Germany, France, Japan, Malaysia, and India—participated. I limited the study to dyadic alliances (only two partners) to be able to capture and measure key variables, such as prior relationship and similarities between partners. The range of relationships includes joint marketing or manufacturing agreements, cooperative R&D, licensing relationships, and joint ventures involving formation of separate legal entities. Executives intimately involved in the transactions were identified by telephone and sent the surveys by facsimile. An earlier work (Saxton, 1995) contains further details regarding the construction of the database and the data-gathering process.

Measures

Dependent variable: Alliance outcomes. The measurement of alliance performance can be problematic (Baird & Lyles, 1993; Geringer & Hebert, 1991). The time frame for payoffs may vary dramatically for different types of relationships. For example, licensing relationships that are expected to last the lifetime of a patent (17 years) and collaborative research and development that must go through several stages of Federal Drug Administration

approval before any cash stream can be generated may take years to unfold. Other relationships, such as joint ventures involving the creation of a new entity or shared manufacturing, may demonstrate financial return within a few months. For these and related reasons, comparisons of financial performance such as return on investment (ROI) alone may be inadequate (Baird & Lyles, 1993; Geringer & Hebert, 1991).

For this study, I used two measures of alliance outcomes. The primary alliance outcome measure was a three-item scale reporting performance as perceived by a partner organization in the alliance (see the Appendix). This scale reflects overall satisfaction with the alliance, the degree to which it has met the goals of the partner, and its contributions to the partner's core competencies (α = .87). I averaged the three items as an overall outcome indicator.[1] Interestingly, in this study termination of an alliance was not necessarily equated with failure. In several cases, executives described alliances that were terminated between surveys as having been successful. Additionally, some met partners' expectations despite their early demises. Such observations suggest that discontinuation should not be equated with failure.

For a second alliance outcome measure, I gathered data on initial satisfaction as part of the first survey. This single item asked partners to assess their level of satisfaction in the first year of an alliance.

Independent variables. Reputation is a latent construct that may vary with the stakeholder queried about it. For this study, the stakeholder of principal interest was a partner in an alliance. Thus, reputation was operationally defined as the perceptions of the representative of a respondent firm of its partner's characteristics. Following recent research (e.g., Brown & Perry, 1994; Dollinger et al., 1997; Fryxell & Wang, 1994), I measured reputation as a multidimensional construct based on an expanded version of the eight-item *Fortune* scale (Fombrun & Shanley, 1990). The three hypothesized dimensions include product quality (seven items, α = .90: return rate, quality, technology, repeat business, reliability, value, and customer relationships); management (nine items, α = .90: experience, integrity, ability to attract, retain, and train employees, decision-making capabilities, good neighbor in community, environmental responsibility, and innovativeness); and financial performance (three items, α = .65: effective use of assets, value as a long-term investment, and financial soundness).

The similarity scale was based on ten items that asked respondents to indicate the similarities between their firm and its partner on a range of

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[1] I also gathered data for objective, quantitative measures to examine the relationships between subjective and objective measures of performance. These included sales and pretax profit margins (PBT) attributable to the alliance activity, and ROI. The objective measures all correlated positively with the subjective scale (ROI: r = .26, p = .07; PBT: r = .17, p = .18; sales: r = .18, p = .11; n ranges from 20 to 30 for these correlations). The consistent positive relationship between subjective and objective measures offers some validation that the subjective three-item performance scale is related to other outcome measures.

organizational attributes including customers, manufacturing capabilities, and various organizational processes. Exploratory factor analysis supported two types of similarities: in strategic content (five items, α = .72: manufacturing, raw materials, technology, marketing, and customers); and in organizational processes (five items, α = .82: accounting and information systems, structure, human relations, and culture). These types of similarities parallel the distinction between strategic and organizational fit discussed previously (Jemison & Sitkin, 1986).

Prior relationship between partners was measured by seven items indicating the extent to which the two firms had a prior affiliation as customer and supplier, competitors, or partners of another type (α = .43; the low alpha is not surprising, as one firm's prior relationship with another as a customer, for example, would not be expected to correlate with a prior relationship as a competitor). I then averaged the seven items to reflect the degree to which any type of prior affiliation existed.

Control variables. Controls included a dummy variable for cross-border (40%) as opposed to within-border alliances (60%); a dummy variable for the chemical industry (57%) as opposed to the pharmaceutical industry (43%); and the expected duration of a relationship measured in months (cf. Heide & Miner, 1992; Parkhe, 1993a). In addition, this study incorporated a range of alliance types, from licensing arrangements to formal joint ventures involving the creation of new entities. The administrative form of an agreement may indicate the motives of the partner companies and have a considerable impact on the outcomes expected (Hagedoorn, 1993; Osborn & Baughn, 1990). To examine this issue, I used joint equity position as a measure of administrative form. If equity in the relationship and outcomes were shared to any extent by the partners, the alliance was coded 1 (47 percent of transactions). If one partner maintained all equity and proceeds were shared by some predetermined contractual method, the alliance was coded 0 (53 percent).[2] There was no significant difference in administrative form between cross- and within-border transactions.

Nonresponse bias. Of some concern was whether respondents in the final sample were representative of the population, and whether respondents to the first survey reflected a bias toward alliances with either good or poor performance. Comparison of nonrespondents to respondents and participants in each round of surveys yielded no significant differences (p >.05).

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[2] There is also considerable potential for interactive effects between the independent and control variables. In particular, administrative form may moderate relationships between the other variables and alliance outcomes. For example, shared decision making and a prior relationship may be much more important for alliances in which partners have shared equity positions. When there is no equity stake, the ability to work together and share in decision making may be less critical. Similarly, management reputation may be less important when two partners are not sharing equity in a relationship. These potential moderating effects were examined in a multivariate analysis, which is discussed below.

RESULTS

Table 1 reports the means, standard deviations, and correlations for the independent and dependent variables. The direction of the hypothesized relationships is generally positive, as is expected in bivariate relationships.

Table 2 displays the results of the ordinary-least-squares regression analyses for combinations of the independent variables with alliance outcomes as the dependent variable. The first three models present the performance scale reflecting sustained benefits to the respondent firm as the dependent variable. In model 4, results for the full model are compared with results for a model with initial satisfaction as the dependent variable. In each case, I added interaction terms reflecting the anticipated moderating effect of administrative form and reported them separately to determine their unique impact on the model. No moderating effects were noted for industry type. A separate analysis of the control variables alone (not displayed) indicates that this combination of variables is not significant ($F = .94$, $R^2 = .04$).

Model 1 captures the effects of the reputation dimensions on alliance performance (see Table 2). This model is significant at the $p < .05$ level ($F = 2.73$, $R^2 = .16$) and explains an additional 12 percent of variance over what the control variables alone explain. Coefficients for management reputation and the dummy variable for cross-border alliance are significant ($p < .05$). Because the reputation dimensions of product quality and management are highly correlated ($r = .69$, $p < .01$), I used a linear combination of these two dimensions (the average of management and quality ratings) in subsequent analyses.[3]

Model 2, isolating the effects of the relationship variables including prior affiliation, degree of shared decision making, and similarities in strategic content and organizational processes, is also significant at $p < .05$ ($F = 2.41$, $R^2 = .18$). The coefficient for shared decision making is significant at the $p < .05$ level. Thus, models 1 and 2 demonstrate that partner and relationship characteristics each have separate, significant effects on alliance outcomes.

Model 3 is the full model with all independent variables. This model offers a stronger, multivariate test of the hypotheses and allows examination of how partner and relationship characteristics simultaneously affect alliance performance. Model 3 is significant ($F = 3.08$, $p < .01$), with an R^2 of .26

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[3] To further test for multicollinearity, I calculated the tolerance value for each variable for models 2, 3, and 4. This statistic reflects the extent to which a combination of the other independent variables explains an independent variable (Hair, Anderson, Tatham, & Black, 1995). Tolerance values under .19 indicate that a multiple correlation of over .9 exists between one independent variable and a combination of all others. In other words, higher tolerance values are better, or at least suggest that multicollinearity is not a major concern (Hair et al., 1995). Though multicollinearity does not affect the assessment of overall model fit, it renders interpretation of individual coefficients problematic. Excluding the interaction terms, the minimum tolerance value is .66 for model 2 (for strategic similarities) and .62 for models 3 and 4 (for the averaged management-quality reputation variable. These tolerance values are not below the threshold at which major concerns would arise.

TABLE 1
Means, Standard Deviations, and Correlations

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Performance	4.51	1.56																	
2. Initial satisfaction	3.59	1.12	.69**																
3. Financial reputation	6.94	2.04	.15	.07															
4. Management reputation	7.32	1.46	.37**	.17	.64**														
5. Product quality reputation	7.66	1.39	.32**	.14	.42**	.69**													
6. Management-quality average	7.48	1.32	.36**	.16	.58**	.93**	.92**												
7. Prior relationship	1.82	0.81	.24	.27*	.12	.10	.15	.13											
8. Degree of shared decision making	4.53	2.07	.29**	.14	.18	.11	.09	.13	-.03										
9. Strategic similarities	3.47	1.7	.32*	.51**	.08	.15	-.02	.07	.18	.17									
10. Organizational process similarities	3.02	1.32	.01	.09	-.04	.10	.06	.08	.08	-.17	.49**								
11. Cross-border vs. within-border alliance	0.39	0.49	.18*	.17	.03	-.15	.01	-.07	.02	.12	.10	-.08							
12. Industry[a]	0.43	.05	-.04	-.19	-.03	.03	.08	.07	-.05	.14	-.37**	-.33*	-.21*						
13. Expected duration	124.51	72.53	.02	-.07	.03	.20	.12	.21	-.23	-.04	-.01	.12	-.28*	.15					
14. Alliance form[b]	0.47	0.5	-.04	-.08	.04	-.09	-.14	-.11	.10	.09	.26*	-.03	.05	-.21*	.15				
15. Form × cross-border	0.17	0.37	.15	.12	-.05	-.27*	-.27*	-.28**	.17	.12	.17	-.09	.63**	-.18*	-.22*	.55**			
16. Form × management	3.38	3.77	.02	-.07	.18	.13	.03	.10	.11	.13	.30*	-.00	-.02	-.17	.17	.96**	.45**		
17. Form × shared decision making	2.31	2.77	.16	.10	.13	-.01	-.06	-.02	.05	.37**	.40**	.01	.07	-.22*	.10	.89**	.52**	.88**	
18. Form × prior relationship	0.73	1.06	.05	.04	.07	-.00	-.07	-.02	.43**	.03	.25*	-.02	.12	-.22*	-.08	.88**	.61**	.88***	.77**

[a] Pharmaceuticals or chemicals.
[b] Equity or nonequity.
* $p < .05$, one-tailed test
** $p < .01$, one-tailed test

and an adjusted R^2 of .17. Individual coefficients for the management-quality reputation variable ($p < 1.01$) and for degree of shared decision making ($p < .05$) are significant.

These findings offer additional support for Hypotheses 1, 3, and 4 (support for the latter is partial), respectively predicting positive relationships between alliance outcomes and reputation, shared decision making, and similarities between partners. From a model fit standpoint, it can be concluded that a model including both relationship and partner characteristics can better explain the benefits from an alliance than can one incorporating either set of variables alone. The full model explains an additional 8 percent of the variance in alliance performance over what the model including just relationship components explains, and the full model explains an additional 12 percent compared to the model including just partner characteristics.

In model 4, the set of independent variables is identical to that in model 3, but initial satisfaction is the dependent variable. This model yields an R^2 of .37 and an adjusted R^2 of .29 ($F = 5.10$, $p < .001$). Coefficients for prior relationship and strategic similarities are significant ($p < .05$, $p < .001$) and in the expected direction. Interestingly, the coefficient for similarities in organizational processes is significant but in the opposite direction ($p < .05$). In this case, results suggest that relationship characteristics are the more important determinants of initial satisfaction in an alliance.

The addition of the interaction terms yields modest improvements to models 1, 2, and 4. The model 3 (full model) results reflect the fact that the addition of two interactions—alliance form with cross-border and form with shared decision making—improves the R^2 to .32 and the adjusted R^2 to .23, with a significant improvement in the model ($F = 3.43$, $p < .001$; change in F significant at $p < .05$). These results suggest that the administrative form of an alliance (equity or nonequity) has a moderating effect, particularly on relationship characteristics.[4]

DISCUSSION

Alliance activity continues to thrive (Gulati, 1995b), even though academic and practitioner accounts report high failure rates (Chowdhury, 1992; *Fortune*, 1992; Harrigan, 1985). Recent research on alliances has focused increasingly on relationship characteristics and on trust in particular as an important consideration for explaining alliance behavior and success. Researchers in this tradition have contrasted organizational trait or resource-driven theories of alliances with interactive theories stressing mutual com-

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[4] In this study, I temporally separated measurement of the independent and dependent variables where appropriate. To examine the potential effect of common methods variance, I calculated the full model (model 3), substituting reputation measures gathered in the second survey (at the same time as performance) for those from survey one. Changing this one group of variables led to an increase in R^2 from 32 percent to 43 percent and an adjusted R^2 of .35. This finding demonstrates the risks of relying on one-shot survey techniques and the trade-offs between methodological rigor and variance explained.

TABLE 2
Results of Regression Analyses[a,b]

	Performance						Initial Satisfaction	
	Model 1: Partner Characteristics		Model 2: Relationship Characteristics		Model 3: Full Model		Model 4: Full Model	
Variable	A	B	A	B	A	B	A	B
Reputation								
Financial	−.15	−.15*			−.13	−.17	−.06	−.09
Management	.39*	.42*						
Product quality	.06	.13						
Management-quality average					.35**	.39**	.10	.12
Relationship								
Prior relationship			.17†	.17	.13	.13	.18*	.19*
Degree of shared decision making			.26*	.12	.23*	.11	.02	−.08
Similarities between partners								
Strategic			.21†	.14	.20†	.14	.60***	.55***
Organizational processes			−.09	−.08	−.11	−.10	−.25*	−.24*
Control								
Cross- vs. within-border alliance	.23*	.05	.15	.10	.16	.03	.07	.00
Industry	−.01	−.02	−.04	−.02	−.05	−.04	−.06	−.05
Expected duration	−.01	.02	.10	.13	.04	.07	.04	.06
Alliance form	.00	.00	−.14	−.76*	−.08	−.65**	−.21*	−.65**
Interaction								
Form × cross-border		.31†				.10		.25
Form × management		−.16						
Form × shared decision making				.61*		.52*		.43†
Form × prior relationship						.06		
R^2	.16	.20	.18	.24	.26	.32	.37	.40
Adjusted R^2	.09	.11	.11	.14	.17	.23	.29	.32
F	2.73*	2.41*	2.49*	2.47**	3.08**	3.43***	5.10***	4.80***
ΔF	4.33**	2.06	3.93**	2.14	3.32**	4.10*	10.99***	2.46†
ΔR^2	.12**	.04	.14**	.06	.23**	.06*	.34***	.03†

[a] Values are standardized regression coefficients; $N = 98$.
[b] "A" indicates analyses without interactions. "B" indicates analyses with interactions.
   † $p < .10$
   * $p < .05$
   ** $p < .01$
   *** $p < .001$

mitment and altruism in a relationship (cf. Heide & Miner, 1992). Although relationship characteristics alone appeared to be better predictors of a firm's initial satisfaction with an alliance, the findings of this study suggest that the combination of both perspectives offers superior explanatory power for predicting sustained benefits to partners in an alliance. Results affirm that partner and relationship characteristics do matter and that alliances are economic actions embedded in a social structure (Granovetter, 1985; Hill, 1990; Nooteboom, 1992).

The expected positive relationship between reputation and alliance outcomes was supported for benefits to partner firms. Although not surprising, this finding may be counterintuitive when examined from a rational economic model of transactions. Theoretically, reputation represents a commodity that can be traded in a market (Hill, 1990). In a transaction in which perfect information is available, the price of this asset would be reflected in the terms of the transaction. The cost of entering a transaction would reflect the total expected payoff—that is, the cost would be a function of the value of the tangible asset being obtained, discounted by the likely cost of the expected future behavior of the partner. The fact that reputation is positively related to alliance success suggests that the value of reputation is not completely bargained away in the transaction. On the other hand, reputation was not significantly related to initial satisfaction, suggesting that the benefits may accrue over time, but not be apparent initially. This finding has important implications for the valuing of intangible assets.

A surprising finding is that prior affiliation was linked to initial satisfaction but not to longer-term benefits to partners. One possible explanation for this finding is that although affiliation has been empirically demonstrated to affect alliance behavior and a propensity to engage with a firm (e.g., Levinthal & Fichman, 1988), it does not have a commensurate impact on subsequent performance. Continued partnering with the same firm could be a function of inertia or of the institutionalization of a relationship, as opposed to a reflection of mutual trust and commitment. In this study, prior affiliation was operationally defined as any type of preexisting relationship or market contact. It was assumed that firms would only enter an alliance when that affiliation had been positive and that prior knowledge of a firm, rather than a positive preexisting working relationship, was the critical factor. I analyzed the components of the prior relationship variable to more closely examine these relationships. First, I examined the relationship between the performance scale and any type of prior affiliation except competitor contact. This relationship was not significant ($r = .16$, $p > .05$). Only an alliance with a supplier was significantly related to this alliance outcome ($r = .29$, $p < .05$). It is possible that more detailed indicators of the type and degree of prior affiliation would yield better insight as to how prior affiliation affects alliance performance. Still, this finding suggests that though companies may be more likely to ally with past partners and more satisfied initially (Gulati, 1995b; Levinthal & Fichman, 1988), past partnership is not predictive of a successful relationship in the long run.

The findings do affirm positive relationships between the degree of shared decision making and strategic similarities between partners and alliance performance. These variables were presumed to reflect trust and commitment, constructs that have received considerable attention in the recent alliance literature (e.g., Parkhe, 1993b). Trust has not been well defined in the extant research (Hosmer, 1995). Given the difficulties of directly measuring this latent construct, the ability to successfully share in decision making may be considered as a condition or determinant of trust (Butler, 1991).

Further refining direct and indirect measures of trust is an important next step toward understanding the role of trust in alliance success.

An interesting and potentially counterintuitive finding is that similarities between partners with respect to specific organizational characteristics, including culture and human resources, were negatively related to alliance outcomes, and that organizational process similarities were negatively related to initial satisfaction. These findings would indicate that the importance of organizational fit as interpreted in the acquisitions literature would be misapplied in the context of alliances (Jemison & Sitkin, 1986; Pennings et al., 1994). The results also contradict the popular idea that "culture clash" negatively influences alliance potential. The negative relationship suggests that although similarities in strategic factors such as manufacturing activities and markets are important to alliance success, it is not as important for a company to pick a partner that thinks in the same way. It is also possible, perhaps even likely, that these relationships are not linear. A certain degree of similarity may be necessary and desirable for understanding a partner. Too much similarity, though, could limit the benefits because nothing novel is being brought to the relationship. More research isolating the effects on alliance performance of similarities between alliance partners in terms of strategic versus organizational process issues is warranted.

The combination of findings helps researchers move closer to an integrated understanding of alliance dynamics. As Nooteboom (1992) and Hill (1990) suggested, a complete transaction cost theory casts relationships in a dynamic context. Knowledge gained through alliance transactions is viewed as beneficial for firms, but the value of the knowledge itself is only one component—the other is the interpretability of that knowledge. Static models of economic decision making ignore the second component. Maximizing the combination of the value of a resource and its transferability is desirable, as is borne out by the findings of this study.

These findings may also have implications for organizational learning (cf. March, 1991). Because they are embedded in a social structure, firms may be reluctant to establish relationships with new partners. Thus, they continue to build on prior relationships with similar firms they either trust or think they understand (Gulati, 1995b). This observation follows a logic of exploitation. To gain infusions of new ideas and to focus on resource value, organizations must seek new partners with good reputations and skills. This observation follows a logic of exploration. To balance exploration and exploitation and to achieve a productive alliance strategy, a focus on the individual components of partner and relationship characteristics, though necessary, is not sufficient. It is the balance of the two that increases the likelihood of a successful relationship.

CONCLUSIONS

This study extends the research on alliances by integrating two approaches to understanding alliance behavior (Hill, 1990) and testing their separate and combined effects on alliance outcomes (Smith et al., 1995)

through a two-stage longitudinal design (Harrigan, 1983). I drew on alternative theories of alliance behavior based on resource dependence, game theoretic, and organizational learning perspectives to hypothesize the effects of partner and relationship characteristics on alliance outcomes. Findings suggest that although initial satisfaction may be explained by relationship characteristics, including a prior relationship with a partner and similarities between partners, a combination of partner and relationship characteristics offers the stronger explanation of sustained alliance success. Partner reputation, degree of shared decision making, and strategic similarities between partners were all found to have a significant, positive relationship to benefits to partner firms from alliance participation.

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APPENDIX

Measures of Partner Reputation, Prior Relationship, Similarity, and Performance

Partner Reputation

"Rate your alliance partner relative to other firms in its industry" (1 = worst in industry, 5 = about average, 10 = best in industry).

1. Experience level of top management team
2. Effective use of assets
3. Return or rework rate (failure of product/service)
4. Value, as a long-term investment
5. Integrity of the top management team
6. Quality of products or services
7. Financial soundness
8. Ability to attract talented employees
9. Decision-making capabilities of the top management team
10. Good neighbor in the community
11. Ability to develop and train employees
12. Technological capabilities
13. Level of repeat business
14. Innovativeness
15. Level of environmental responsibility
16. Reliability of products or services
17. Ability to retain valuable employees
18. Relative value of products or services
19. Customer relationships
20. Overall reputation

Prior Relationship

"Please circle the number which best describes the extent to which the following relationships represent the partner's relationship with your company prior to forming the alliance" (1 = never, 4 = sometimes, 7 = almost always).

The partner was a:

1. Customer
2. Supplier
3. Competitor
4. Alliance partner
5. Licensee/licensor
6. Distributor
7. Other (please specify)

Similarity

"Please indicate the degree to which the operations of your firm are **similar** to those of the partner firm" (1 = very similar, 7 = not at all similar). These items were reverse-coded in analyses.

1. Marketing
2. Manufacturing
3. Raw materials
4. Accounting systems
5. Information systems
6. Structure
7. Technology
8. Customers
9. Culture
10. Human resources

Performance

"Please circle the appropriate number to indicate the degree to which you agree or disagree with each of the following statements regarding the **performance of the alliance**" (1 = strongly disagree, 4 = neutral, 7 = strongly agree).

1. Overall, we are very satisfied with the performance of this alliance.
2. The alliance has realized the goals we set out to achieve.
3. The alliance has contributed to our core competencies and competitive advantage.

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U.S.-JAPANESE MANUFACTURING
EQUITY RELATIONSHIPS

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We explored the differences between the joint venture, total ownership,
and partial equity positions used by Japanese companies investing in
U.S. manufacturing via a secondary data analysis. Partial ownership
was used significantly more often in high-technology industries. Joint
ventures were significantly more likely to be used in politically sensitive
industries and in new entities, and when the Japanese partner had
experience with the product.

The formation of cross-border relationships between firms is a favored
strategy in the general movement toward the globalization of technical (Os-
born & Baughn, 1995; Penner-Hahn, 1996) and manufacturing resources
(Flaherty, 1996). Japanese investment has gained considerable attention in
the popular press and research literature. The alliance literature in particular
has focused on links between Americans and the Japanese since the latter
have earned a reputation as good manufacturers. Such headlines as "GM to
Sell Its 50% Stake in GMFanuc, A Robotics Firm, to Japanese Partner" (*Wall
Street Journal,* 1992) and "IBM, Toshiba, Siemens to Team Up" (Ziegler,
1992) show that the dissolution and formation of joint ventures and other
partnerships in manufacturing continue to be for high stakes and to provide
high drama in the world competitive scene. However, the reasons for the
formation and dissolution of these ventures and equity relationships are still
not well understood.

Interest in U.S. manufacturing alliances has been heightened during the
last decade by the substantial increase of the Japanese presence in very large
and basic industries like automobiles, steel, and aircraft. Celebrated examples
include the New United Motor Manufacturing, Inc. (NUMMI), which is a
joint venture between General Motors Corporation and Toyota (Adler, 1992)
and the 20 percent nonequity partnership the Boeing Company formed with

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three Japanese companies—Mitsubishi, Fuji, and Kawasaki—to build the Boeing 777 commercial airliner (Stevenson, 1992). Japanese direct investment in U.S. manufacturing totaled $69.7 billion in 1989, second only to Great Britain's investment in the United States (Japan Economic Institute, 1991). But beyond the few celebrated cases of U.S.-Japanese manufacturing alliances, what is really known of the broad range of Japanese equity investments in the United States?

Previous empirical studies of Japanese direct investment in the United States have focused on two main areas: the choice of total ownership or joint venture by Japanese parents, and the purchase of U.S. companies. Alternative ownership structures have rarely been studied. In this research note, we propose and demonstrate that the potential motives for Japanese direct investments and the conditions under which these investments are made are quite diverse. This diversity in investments and ownership structures is difficult to capture and measure statistically. Moreover, many of the studies conducted to date have failed to capture this rich diversity of motives, ownership, and governance structures.

We propose and test a model that predicts the structure of Japanese direct investment in U.S. manufacturing firms, a model that could be also used to predict outcomes in other economic regions. We conclude that industry R&D intensity, an investing firm's previous experience with a product, political considerations, and start-up status all influence the equity structures used in direct investment. Specifically, Japanese firms often used partial stock purchases to acquire partial equity positions in high-technology firms. Joint ventures were preferred in politically sensitive industries such as automobiles and steel and were used when the Japanese firms had prior experience at home with the product being manufactured. The results suggest a fine-grained approach to studying governance structures that might add much to knowledge of Japanese direct investment specifically and of manufacturing alliances generally.

JOINT VENTURES AND FOREIGN DIRECT INVESTMENT

The literature on foreign direct investment is among the most popular in international business research (Inkpen & Beamish, 1994). Recent examples include Grosse and Trevino's (1996) review and empirical study of foreign direct investment in the United States. The authors used U.S. Department of Commerce data to show that the amount of existing trade between the United States and a country, as well as the size of the home country market, significantly and directly influence the amount invested by parents from that country in the United States. Those authors took size of the home country market as a proxy for the "number of home country firms that could pursue international expansion" (Grosse & Trevino, 1996: 144). Distance (cultural and geographic) from the home country to the United States inhibited foreign direct investment, as did unfavorable exchange rates. Another example of research in this area is Rivoli and Salorio's (1996) model of the timing of foreign direct investments, which they based on work on the economics of

uncertainty. This literature modifies the theory of investments based on cost benefits alone by including the value of options. When the value of options is taken into account, circumstances often recommend delayed foreign direct investment.

Yet one of the most appealing ways of differentiating among types of foreign direct investment is to consider joint ventures, subsidiaries, and other equity arrangements or partnerships as constituting varying degrees of internalization. Not only is there considerable general sustained interest in transaction cost economics (Groenewegen, 1996), this interest persists in the international alliance literature. Buckley and Casson's (1988) theory of cooperation in international business is based on the general notion that mutual forbearance appeals to agents who take a long-term view. Joint ventures (JVs) are formed when there is "some net benefit from internalizing a market in one or more intermediate goods and services flowing between the JV and the parties' other operations" (Buckley & Casson, 1988: 27). Dunning expanded upon this theme by arguing that multinational enterprises improve their competitive positions by "internalization of a whole set of cross-border market failures . . . most noticeably those with environmental volatility and economics of scope and scale" (1993: 10).

Focusing just on equity joint ventures of two types (scale and linking, or nonsymmetrical), Hennart (1988) argued that although joint ventures may not necessarily minimize transaction costs, they are quite desirable when economies of scale can be achieved and risk diversified. Joint ventures are also best when entry barriers can be overcome, complementary information can be pooled, and xenophobic reactions need to be minimized. When markets are imperfect, joint ventures are a viable alternative to other ownership structures. In addition, industry variables (R&D intensity and political sensitivity), the size of an investment, an investing firm's experience making the focal products at home, and the newness of the investment may all affect the choice of an equity position or a governance structure.

What this literature generally ignores is that firms can either create new joint ventures or buy into old ones. Further, the Japanese take a unique approach toward buyer-supplier relationships (Imai, 1986) and may apply a similar approach to foreign direct investment using partial ownership equity positions. We take up these issues next.

Many authors have sought to explain foreign direct investment as a choice between totally owned subsidiaries and joint ventures (e.g., Christelow, 1989; Geringer, 1991; Gomes-Casseres, 1987; Hennart, 1991; Kogut, 1991). Although Osborn and Baughn (1990) looked at a wider range of arrangements for joint R&D in U.S.-Japanese relationships, few authors have considered equity arrangements other than joint ventures and wholly owned subsidiaries in any setting. Tyebjee's (1988) typology of reasons for the formation of joint ventures provides a more detailed explanation of the formation of such ventures, but he did not suggest that the different reasons for formation might produce different equity arrangements.

Most of the literature on Japanese direct investment in the U.S. concerns the formation of joint ventures, which are legally independent enterprises formed with the pooled resources of two or more independent parent companies. Many factors have been linked to the decision of Japanese companies to form joint ventures, including market access, innovation, R&D, access to resources, industry concentration, and industry maturity.

Although the variables and industry contexts studied with regard to joint venture formation have been extensive, the general approach for most previous research has been to measure the amount of Japanese control of the offspring, either through a categorical variable (joint venture versus total ownership) or through a ratio variable such as percentage of ownership (Blodgett, 1991; Boyle, 1968; Christelow, 1989; Hennart, 1991; Pfeffer & Nowak, 1976; Pfeffer & Salancik, 1978).

Pfeffer and Salancik (1978) suggested that firms establish joint ventures to control resource dependencies. Under this theory, firms form joint ventures to share risk (including R&D), to combine facilities and thus obtain economies of scale, or to generate capital. Pfeffer and Nowak (1976) found that firms form joint ventures with partners when there is industry interdependence (sales and purchases) and high technological intensity. Egelhoff (1992) studied technical alliances in the semiconductor industry and found that smaller firms spent greater proportions of their R&D budgets on technical alliances (including joint ventures and other forms). Hennart (1991) used transaction cost theory to show that firms used joint ventures to share resources when doing so was less costly than purchasing or creating the needed resources. In this sense, firms often use joint ventures to gain access to technology or facilities that would be too costly for them to buy outright or build from the ground up. In previous research (Ettlie & Swan, 1995), we suggested that Japanese companies have generally preferred total ownership but used joint ventures to provide access to resources that would otherwise be unavailable (for instance, because of patent restrictions) or too expensive. Yet the forms of these equity relationships might grow more complex and change over time (Buckley & Casson, 1988; Hennart, 1988).

We propose that there are three basic types of ownership structures. These structures include the two most authors have addressed, total ownership and joint venture, and a third, which we call partial ownership. This third capital structure is characterized by two forms. First, an investing foreign firm can buy a substantial block of the stock of a target firm. The precedent for this practice is firms' establishing partial equity positions in domestic trading partners to avoid opportunism (Flath, 1994). Although Hennart (1991) considered such partial buyouts of existing firms to be joint ventures for his study, we consider them a separate category.

Second, partial ownership can take the form of a foreign investing firm's sharing equity in a new company with individual investors who are usually officers in the new company, rather than sharing equity with existing manufacturing corporations. Typically, the partially owned firm makes a product that was designed or partially manufactured by the foreign investor.

FIGURE 1
Japanese Direct Investments in U.S. Manufacturing by Year and Equity Arrangement[*]
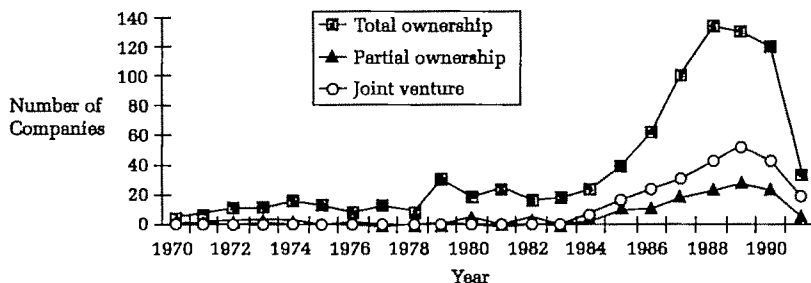
* Data are from the Japan Economic Institute (1992). No later data on Japanese direct investment are available. However, since 1992 direct investment from Britain, Germany, France, and Japan is up sharply (Phillips, 1997).

For the purposes of this study, a partially owned firm is either an existing company that has had a substantial amount of stock purchased by a Japanese company or a start-up in which substantial amounts of stock are held publicly or privately by individuals. This definition could easily be generalized to any direct investment partner. Figure 1 plots Japanese direct investment in U.S. manufacturing firms during the period 1970–91, with data broken down by ownership structure.

Table 1 further breaks down Japanese direct investment using Japan Economic Institute 1992 data showing the division between existing and new operations. It is important to note again that in most previous studies our categories of joint venture and partial ownership are both considered joint ventures. Although historically partial ownership has seldom been used, by 1991 it had become quite popular.

Taken together, these data and theories suggested several predictions for testing. First, several contributions (cf. Auster, 1990; Christelow, 1989; Daniels & Magill, 1991; Egelhoff, 1992; Hagedoorn & Narula, 1996, Osborn & Baughn, 1990) appear to converge on the notion that there is a salient relationship between type of industry—high-technology or low-technology—and the proportion of Japanese investment in U.S. manufacturing joint ventures,

TABLE 1
Japanese Direct Investment in the United States, 1991[*]

Type of Ownership Structure	Existing Manufacturers	New Manufacturing Operations
Total ownership	296	574
Joint venture	48	171
Partial ownership	100	35

* Source: Japan Economic Institute (1992).

defined broadly. Transaction cost theory applied in the foreign direct invest-
ment literature (e.g., Buckley & Casson, 1988) rests on the assumption that
R&D intensity is a measure of uncertainty and that uncertainty favors hierar-
chical solutions such as total ownership. Some empirical evidence shows
less use of hierarchy when R&D intensity is high (Hagedoorn, 1993). Blodgett
(1991) found that equity positions were the result of differing contributions
of the partners involved, but she studied only joint ventures. Blodgett sug-
gested that the dominant firm in a joint venture contributed the dominant
technology. In this sense, a joint venture with two groups sharing equal
ownership might reflect greater involvement by both parties, U.S. and Japa-
nese. Wolff (1994) showed that most R&D funds in the United States are
spent on new products, which suggests that R&D intensity may not capture
process innovation. Japanese firms are known for outstanding use of pro-
cess innovation.

   We (Ettlie & Swan, 1995) found the R&D ratio to be inversely related to
the percentage of a U.S. company owned by Japanese parents. Together, the
weight of these results and arguments suggest that partial ownership is the
preferred form of Japanese investment in high-tech (high-R&D-intensity) U.S.
manufacturing industries because less help is needed in the U.S. firm to
bring new products to market, and the Japanese can assist in process technol-
ogy without threatening the proprietary product knowledge of the U.S.
partner.

> *Hypothesis 1. The higher the R&D intensity of a manu-
> facturing industry, the greater the tendency for U.S.-Japa-
> nese manufacturing alliances to have a partial ownership
> structure rather than a joint venture or total ownership
> structure.*

   Japanese ownership of manufacturing facilities continues to be a sensi-
tive political issue in the United States. The decline of such basic industries
as steel, machine tools, consumer electronics, and automobiles has been tied
to an increase in sales to Japanese companies. Consequently, many Japanese
companies favor investment alternatives other than total ownership in highly
visible industries such as steel and automobile production (Abo, 1992; Chris-
telow, 1989). Two factors may contribute to the visibility of a company. First,
its industry may be politically sensitive, a condition often accompanied by
the presence of import protection, as is the case in the auto and steel indus-
tries. Second, the reputation of a parent company or companies may increase
an entity's visibility. The visibility of firms also increases with their size.
For large ventures, equity positions may be more desirable than total owner-
ship, as the former imply that foreign (Japanese) parents are investors rather
than owners. Joint ventures represent some loss of control for Japanese par-
ents. A partial equity position also represents a loss of control in firms in
which Japanese parents had patents or a proprietary technology for the prod-
uct produced or the process used or provided major components. In such
instances, a joint venture is a compromise between control and political

sensitivity and between total ownership and partial equity. Therefore, we offer the following:

> *Hypothesis 2. Japanese firms investing in U.S. manufactur-*
> *ing industries that are politically sensitive in that they*
> *have or are threatened with government-mandated import*
> *restrictions are more likely to use joint ventures rather*
> *than partial ownership or total ownership.*

The attractiveness of partial equity positions might decline as the size of a target firm increases. The risk associated with any investment grows with its size. The higher risk associated with larger investments may cause Japanese investors to take a total equity position for very large targets. Additionally, the ability of individual investors to finance substantial portions of start-up companies would be limited in many cases. Therefore, for large, new firms, both Japanese and U.S. investors will prefer joint ventures. Total ownership will be preferred when markets fail, but difficulty in transferring technology to a U.S. plant increases with firm or plant size and with the number of people to whom the technology must be transferred. Technology transfer methods can be learned, even though some researchers have noted that culture plays a part in such technology transfers (Brannen, 1992; Bushe, 1988). The difficulty in changing culture and technology may influence Japanese companies to use joint ventures with particularly large companies. Therefore, risk, scale, and technology transfer issues favor use of joint ventures for new entity creation over time.

> *Hypothesis 3. New entities are likely to be created as*
> *joint ventures between Japanese and U.S. manufacturing*
> *partners.*

Although partial equity positions may be used for existing companies of virtually any size, their use in new firms may be more limited. Small firms generally have less visibility and thus less need for an obscured Japanese presence. Large firms would rule out partial equity positions because private investors would be unable or unwilling to provide the money necessary for such an arrangement, all other things being equal (e.g., the R&D intensity of the industry).

When Japanese parents buy into existing operations, they are likely to use process technology for improvement (Tyebjee, 1988). Japanese parents, which were the only companies involved in partial equity positions in the data on the United States used in this study, often supply both product and process technology from past home market experience. But these are situations more likely to involve established industries—and thus, in which use of joint ventures is more likely. We argue that experience is more important than industry (Hennart, 1991).

> *Hypothesis 4. Japanese firms are likely to use joint venture*
> *ownership in U.S. manufacturing if the Japanese firms*
> *make similar products in Japan.*

METHODS

Data

Data for this study were obtained from secondary analysis of the Japan Economic Institute (1992) report on direct investment in U.S. manufacturing rather than from cross-national comparison (Lynn, 1991) or laboratory simulation. These data on 1,224 cases of direct investment were the most recent available at the time of this writing. We used all domestic cases regardless of whether the non-Japanese partner was a U.S. company or a foreign firm. According to this report, Japanese direct investment in U.S. manufacturing peaked in 1988 and totaled $67.8 billion in 1989.

Sample

Most Japanese investment in the United States involves 100 percent ownership, both in start-ups and in acquisitions. We considered ownership of between 95 and 100 percent of equity to be total ownership, following previous research (see below). Seventy-one percent (870 cases) of the direct Japanese investments captured in the data set involved total ownership. The remainder of the 354 cases varied from 10 percent to 95 percent equity investment positions, with the majority being 50-50 partnerships (104, or 8.5 percent of the total 1,224). Most of the 1,224 cases of direct Japanese investment were new company start-ups (780, or 63.7 percent).

Hennart stated the following: "Wholly owned affiliates are defined as those in which a Japanese parent owns more than 95% of the equity, while joint ventures are those in which one or more Japanese parents own between 5 and 95 percent of the equity. Note that joint ventures include partial ownership in free-standing firms as well as minority ownership in ongoing concerns" (1991: 487). Hennart and Park (1993) also used the 95 percent cut-off point in their study.

Variables

The major variables available from the Japan Economic Institute report included year formed, acquired versus new firm status, number of employees, number of factories, location, product, four-digit Standard Industrial Classification (SIC) code, parents, and percentages owned. From these data, we were able to find the total percentage of Japanese ownership and the total percentage of U.S. ownership. We defined a joint venture as a manufacturing firm and separate legal entity, with a Japanese parent or parents and a U.S. or non-U.S. parent or parents, established in the United States. A partial ownership firm was one owned just by Japanese companies and other investors (not by other companies). The data only apply to the establishment of each direct investment case; we had no data on the later evolution of the ownership of these entities.

R&D intensity was developed by linking each entity's four-digit SIC code with its rating in a 1991 list of the aggregate R&D intensity of U.S. firms. R&D intensity was defined as R&D investment expressed as a percentage of

net sales averaged for each industry. Figures published by Schonfeld and Associates (1991) were used for this purpose. These numbers provided the most complete data published for each four-digit SIC code.

The number of employees for each direct investment entity case was used to represent entity size. We considered using the natural logarithm of number of employees, but that measure was collinear with some other variables in the study.

A variable was included to represent whether direct investments were new companies (1) or acquired (0).

Data from Dodwell Marketing Consultants (1990), the Japan External Trade Organization (1992), and the Japan Chamber of Commerce and Industry (1991) were used to determine if any Japanese parent of an entity produced a product in Japan that was similar to the entity's product or products in the United States (1 = Japanese parents with similar products, 0 otherwise).

One variable was used to represent industry effects. Christelow (1989) stated that direct investments are used in response to political pressure resulting from foreign inroads into important U.S. industries, such as autos and steel. Autos and steel combined accounted for 209 cases of the 776 used in the discriminant analysis we conducted. Legislators have threatened or implemented import restrictions for both of these industries. A variable was constructed representing investment ventures involved with auto or steel manufacturing (1 = involvement, 0 = no involvement) to represent potential political influence factors.

Interaction Terms and Controls

Two interaction terms were included: entity size by industry R&D intensity, and new entity by firm size. To control for cohort effects for the year in which investments were made, the year of the Japanese investment was included. Experience in the United States was measured by the difference (in years) between each Japanese firm's first investment and each later investment. To control for resource access, we used two measures: the ratio between the numbers of employees in an entity and the number of employees in its largest Japanese parent, and the logarithm of the sales of the largest Japanese parent. Data for these measures were obtained from Toyo Keizai (1987).

RESULTS

Amemiya (1981) pointed out that use of logistic regression models leads to overclassification of cases into the largest category. In this case, a logistic model would classify too many Japanese investments into the total ownership category. Preliminary analyses showed this to be true. To overcome these problems, we instead used discriminant analysis, both the parametric and nonparametric versions (Tabachnick & Fidell, 1983; SAS Institute, 1989, 1992) to compare and predict use of partial equity and joint venture ownership structures.

The correlation matrix appears in Table 2, and the results of the nonparametric and parametric discriminant analyses appear in Tables 3, 4, and 5. The 11 grouping or predictor variables account for 36 percent of the variance in Japanese direct investment in U.S. manufacturing for the joint ventures, partial equity positions, and total ownership cases studied. For the nonparametric analysis, Wilks's lambda was .74 ($p < .0001$), which is highly significant. The other multivariate statistics were also highly significant (Pillai's trace, Hotelling-Lawley trace, and Roy's greatest root, all $p < .0001$).

The results of the nonparametric analysis show which variables are significant predictors of equity structure. The coefficients from the parametric analysis show the direction of influence for each variable. We used the linear discriminant function coefficients (Table 5) from the parametric analysis to test predictions.

Hypothesis 1 states that the R&D intensity of a U.S. manufacturing industry will be directly related to selection of partial ownership as the form of Japanese direct investment into that industry. Without the control variable for year of investment, the nonparametric prediction using R&D intensity is significant ($F = 20.41$, $p < .0001$, $R^2 = .05$), and the parametric discriminant function coefficients for R&D intensity and three categories of direct investment are as follows: joint venture, 0.31; partial equity, 0.54, and total ownership, 0.39 (not shown in Table 5). With the control variable for year of investment included, R&D intensity is still a significant predictor in the nonparametric discriminant function ($F = 20.41$, $p < .0001$, $R^2 = .05$). The parametric linear discriminant function coefficients for R&D still favor partial equity (-15.85) versus joint venture (-16.09) and total ownership (-15.99). These results strongly support Hypothesis 1.

Hypothesis 2 predicts that Japanese partners will prefer to use joint ventures in very visible, large, and politically sensitive U.S. manufacturing industries like automobiles. The auto and steel industries were grouped together in a single variable to predict direct investment type (Table 4), and this predictor was highly significant ($F = 43.28$, $p < .0001$), accounting for 10 percent of the total variance in the equation. The coefficients in the linear discriminant function (Table 5) were as follows: joint venture, -98.42; partial ownership, -100.01; and total ownership, -100.15. With the control variable for year of investment removed, the coefficients were joint venture, 4.25; partial ownership, 2.57; total ownership, 2.43 (not shown in Table 5). These results support Hypothesis 2.

Hypothesis 3 suggests that when new entities are created, joint ventures are the preferred governance structure. New entity is a significant predictor (Table 4; $F = 52.18$, $p < .0001$). As predicted, the coefficient for joint venture was 115, versus 112 for partial equity and 114 for total ownership. These results strongly support Hypothesis 3.

When a Japanese investor had prior experience making a product at home, it was more likely to use a joint venture as an investment strategy in

TABLE 2
Descriptive Statistics and Correlations[a]

Variable	N	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Partial ownership	1,224	0.11	0.31													
2. Joint venture	1,224	0.18	0.38	-.16***												
3. Total ownership	1,224	0.71	0.45	-.55***	-.73***											
4. Number of employees	1,224	1,074	307	.05	.04	-.07*										
5. Industry R&D intensity	1,223	3.05	3.00	.16***	-.13***	.00	-.01									
6. Product experience of Japanese firm	1,076	0.95	0.23	-.09**	.03	.04	.02	.00								
7. New entity	1,224	0.64	0.48	-.28***	.14***	.07*	-.16***	-.12***	.05							
8. Autos and steel	1,224	0.29	0.45	-.09**	.28***	-.17***	.09**	-.22***	.01	.20***						
9. New entity × number of employees	1,224	115	409	-.08**	.01	.05	.33***	.04	.05	.21***	.14***					
10. R&D × number of employees	1,223	903	2,709	.05	-.02	-.02	.60***	.29***	.04	-.14***	.00	.45***				
11. Year	1,224	1,986	5.50	.02	.13***	-.12***	-.00	.06	-.05	-.07**	.15***	-.08**	-.05			
12. Japanese firm's experience in U.S.[b]	1,224	4.34	6.41	.05	.05	-.08**	.03	-.01	-.01	-.08**	.05	.02	.05	.24***		
13. Japanese firm's sales[c]	782	12.31	1.80	.09**	.05	-.11**	.18***	.08*	-.03	-.04	.01	.18***	.21***	-.06	.45***	
14. Number of employees/ number of employees, Japanese firm	782	0.01	1.09	.10**	-.03	-.04	.12***	-.03	-.02	-.09*	.06	-.00	.06	.02	-.06	-.10**

[a] N varies because of pairwise deletion of variables. Values have been rounded to two decimal places throughout the analyses.
[b] In years.
[c] Natural logarithm.

* $p < .05$
** $p < .01$
*** $p < .001$

TABLE 3
Parametric Discriminant Analysis Results: Coefficients from the
Linear Discriminant Function

Variable	Joint Venture	Partial Ownership	Total Ownership
Constant	−97,259.	−97,093.	−97,083.
Number of employees	−0.03	−0.03	−0.03
Industry R&D intensity	−16.10	−15.85	−16.00
Product experience of Japanese firm	133.68	131.61	133.54
New entity	115.02	112.44	114.45
R&D × number of employees	0.01	0.01	0.01
Autos and steel	−98.42	−100.01	−100.15
New entity × number of employees	0.02	0.02	0.03
Year	97.43	97.34	97.34
Japanese firm's years of experience in U.S.	−28.78	−28.72	−28.74
Japanese firm's sales[a]	76.55	76.51	76.33
Number of employees/number of employees, Japanese firm	−0.69	−0.37	−0.63

[a] Natural logarithm.

U.S. manufacturing ($F = 7.30$, $p < .0001$); the largest coefficient is for joint .ventures (133.68). This finding supports Hypothesis 4 and is consistent with Hypothesis 2 since a U.S. industry is more likely to be threatened by a strong competitor from overseas—in this case, one entering from the very competitive Japanese home market.

TABLE 4
Nonparametric Discriminant Analysis Results for Joint Venture,
Partial Ownership, and Total Ownership in Japanese
Direct Investment in U.S. Manufacturing[a]

Variable	R^{2}[b]	$F(2, 773)$	p
New entity	0.12	52.18	0.0001
Autos and steel	0.10	43.28	0.0001
Industry R&D intensity	0.05	20.41	0.0001
Year	0.02	9.20	0.0001
Product experience of Japanese firm	0.02	7.30	0.0007
Japanese firm's sales[c]	0.01	4.98	0.0071
New entity × number of employees	0.01	3.75	0.0240
Number of employees/number of employees, Japanese firm	0.01	3.44	0.0327
Number of employees	0.01	2.82	0.0733
Japanese firms's years of experience in U.S.	0.01	2.53	0.0804
R&D × number of employees	0.01	2.21	0.1109

[a] Through 1991.
[b] Total $R^{2} = 0.45$.
[c] Natural logarithm.

TABLE 5
Nonparametric Discriminant Analysis Results[a]

Statistic	Value	F	df	p
Wilks's lambda	0.74	11.51	(22, 1,526)	0.0001
Pillai's trace	0.28	11.39	(22, 1,528)	0.0001
Hotelling-Lawley trace	0.34	11.62	(22, 1,524)	0.0001
Roy's greatest root	0.23	16.21	(11, 764)	0.0001

[a] The F-statistics for Roy's greatest root is an upper bound; the F for Wilks's lambda is exact.

We tested the validity of the model with a nonparametric classification analysis, presented in Table 6, which reveals very good results. Only 10 percent of the cases were misclassified. This nonparametric classification option under the SAS (1992) discriminant analysis program is a considerable improvement over the parametric classification (for which 30 percent were incorrect). Since the baseline of direct investments is swamped by total ownership, it is particularly gratifying to see the model correctly classify 96 percent of the joint ventures and 99 percent of the partial ownership cases. Table 6 shows a classification table for each model.

In Table 7, we present the cumulative distribution of cases by ownership type (partial ownership, joint venture, and total ownership) for three years: 1981, 1986, and 1991 (Table 1 summarizes cumulative 1991 data only). For the new cases, the proportion with a partial ownership structure goes from 7 percent (11) to 6 percent (19) to 4 percent (35) of the total number of cases over this period. That is, new partial equity cases are a small proportion of the new cases and decline slightly over the study period.

TABLE 6
Discriminant Analysis Results: Nonparametric Classification Summary

Type	Joint Venture	Partial Ownership	Total Ownership	Total
Classification by type				
Joint venture	151	4	3	158
	95.57	2.53	1.90	100.00
Partial ownership	0	86	1	87
	0.00	98.85	1.15	100.00
Total ownership	75	54	402	531
	14.12	10.17	75.71	100.00
Total percent	226	144	406	776
	29.12	18.56	52.32	100.00
Priors	0.33	0.33	0.33	
Error count estimates				
Rate	0.04	0.01	0.24	0.10[a]
Priors	0.33	0.33	0.33	

[a] Ten percent incorrect.

TABLE 7
Data Summary*

Cumulative to Date	Partial	Joint Venture	Total
1981 New	11 (7%)	8 (5%)	135 (88%)
1986 New	19 (6)	42 (14)	242 (80)
1991 New	35 (4)	171 (22)	574 (74)
1981 Old	10 (16)	4 (6)	49 (78)
1986 Old	25 (17)	18 (12)	107 (71)
1991 Old	100 (23)	48 (11)	296 (67)

* Source: Japan Economic Institute (1992).

When the number of partially owned firms is expressed as a proportion of old or existing firms, partial equity ownership increases over the study period. In 1981, existing partial equity cases constituted 16 percent (10) of the old firms; in 1986, there were 25 partial equity firms (17%), and in 1991, there were 100 (23%).

New and existing joint ventures increased or plateaued as a proportion of each group. That is, joint ventures of both types increased their proportions of the total. In 1981, 1986, and 1991, joint ventures represented 5, 14, and 22 percent, respectively, of the new firms. For the old firms in the same years, joint ventures represented 6, 12, and 11 percent, respectively.

Total ownership cases declined as a proportion of both new and old cases. For new firms in 1981, 1986, and 1991, the proportion of total ownership cases is 88, 80, and 74 percent, respectively. For old or existing firms, the proportions also decline to 78, 71, and 67 percent, respectively. Either markets are becoming less flawed, or Japanese and U.S. partners are learning how to manage more complex alliances, or both. Otherwise, total ownership would be increasing as a proportion of these two types (new and old) and the total.

DISCUSSION

We compared foreign direct investments from Japanese parents using partial equity, joint venture, and total ownership structures to gain further insight into reasons for their formation. One of our goals was to point to a problem with simple economic modeling of foreign direct investment decisions, which can be quite complex.

Technological innovation is a factor in investment strategy and governance, as others have found (e.g., Osborn & Baughn, 1990, 1995). Uniquely, we found that the R&D intensity of the U.S. industry and the Japanese choice of partial equity were significantly related. Transaction cost theory alone does not predict the complexity of these ownership structures.

Although we represented partial equity ownership as a singular condition in this research, we know of at least two different types of partial equity positions. There is little precedent in the literature for consideration of this type of foreign direct investment (e.g., Flath, 1994; Tyebjee, 1988). In one type

of partial equity investment, firms can receive needed capital in exchange for giving stock to Japanese partners. Amdahl Corporation's 1973 receipt of capital and support from the Fujitsu Company in exchange for Amdahl stock is an example. In another type of partial equity investment, individual investors hold blocks of stock. The formation of Nissui Corporation in 1988 by Nissui Kako Company and other, unnamed, investors is an example.

Partially owned firms, which are usually in high-tech industries, are not true joint ventures, since individual investors hold substantial blocks of the stock. The use of this equity structure and the growth in total ownership by Japanese firms suggest a learning effect not previously captured in the literature. Although we do not have any data on the relationship between the Japanese parents and the individual investors in the cases studied, we observed that there was usually a relationship before a firm was formed. It appears that in many cases a U.S. investor previously imported products from the Japanese parents. Such firms may be started to add value to imported products or to position assembly or fabrication closer to the point of demand. Technology transfer considerations and learning might outweigh transaction costs. Joint ventures are preferred and more prevalent when the Japanese parents make similar products at home. The data support the proposition that joint ventures are favored in industries threatened with trade restrictions and in which a seasoned (by a competitive home market) Japanese investor enters. Joint ventures are preferred when a new entity is created.

Ownership structure is often used as a measure of control. Hennart (1991) pointed out that control and ownership do not correspond perfectly and that control can be achieved with less than total ownership. Both we (Ettlie & Swan, 1995) and Abo (1992) concluded that total ownership was the governing method of choice. Is this a function of the transaction costs of partial equity and joint venture ownership, or is it a function of the desire for complete control? Is there a difference between the two? Are there new ways to control operations abroad without joint ventures?

The results of this study suggest an evolution to new types of equity relationships. In particular, the proportion of cases of total ownership declined during the study period, and the proportion of partial equity types using existing firms increased. Joint ventures (new) increased or increased and plateaued (old). Either markets become more efficient (suppliers learned to build better quality), or the resources of Japanese partners declined, or partners learned how to manage more complex firms in manufacturing (cf. Nitsch, Beamish, & Makino, 1995).

Clearly, there are many reasons for the formation of investment patterns and governance structures other than ownership. Since new firms in visible industries with experienced Japanese parents used joint ventures, there is an evolving pattern in these results. However, limitations of the data and of discriminant analysis make modeling several different reasons for ownership difficult. Future work is warranted. Data restrictions also prevented a detailed, fine-tuned examination of the evolution of ownership and governance structures. This work also remains to be done.

The results of this research suggest that there has been an evolution in the choices of both Japanese direct investors and U.S. partners in U.S. manufacturing. Increasingly, partial equity positions and joint ventures are preferred over total ownership. The relationships are often not clear-cut, but the structuring of these equity relations does seem to follow patterns detectable in this type of research. Since Japanese manufacturing firms tend to try a standard approach to establishing direct investment in manufacturing, regardless of location (e.g., Abo, 1992; Nanaka & Takeuchi, 1995), the results might at least generalize to Western-Japanese coalitions and perhaps even to those in other regions of the world. (e.g., Central Europe, Asia, South America. If this were the case, the relationships in these alliances could be shown to transcend economic regional barriers. A formidable governance theory concerning globalization could follow.

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CONTENTS
Volume 40, Number 3, June 1997

FROM THE EDITOR

I would like to devote this statement to discussing how appointments are made to *AMJ*'s Editorial Review Board. Over the past nine months, since the new editorial team (Rita Kosnik, Greg Northcraft, and I) was formed and announced, we have received numerous recommendations and self-nominations for the Editorial Board. We have also received questions about the appointment criteria. Let me try to clarify and demystify the process for you.

The Editorial Board is a group of accomplished scholars who have shown their commitment and service to the field by having performed outstanding reviews for the *Journal.* Some may have reviewed for three or four editors before being appointed to the Board. Some may be appointed relatively early in their careers. What is common to this group of scholars is that they all have

- Provided insightful comments about the strengths and weakness of manuscripts
- Offered constructive and specific suggestions to authors
- Been timely in returning their reviews
- Helped authors improve their work regardless of the actual recommendation (i.e., accept, reject, or revise) made to the editor.

Therefore, appointment to the Board requires both timely and high-quality reviews. Each editor has his or her method of assessing reviewer quality. However, the quality of a review is obvious to most people, especially authors. Rita, Greg, and I look for the above qualities in a review when we are writing decision letters. We have discovered a number of excellent ad hoc reviewers. If a recommendation for Board membership (or a self-nomination) is made to us and we do not have sufficient information from past review records, we ask the nominated individual to conduct several reviews so we can accumulate new data on his or her review performance. We make the invitation to serve on the Editorial Board only when we are confident that we will be able to rely on a reviewer for consistently high-quality and timely reviews in the future. One last relevant factor is the match between the areas of expertise of the reviewer and the flow of submitted manuscripts. Because of the diversity of topics and the relatively uneven submissions across topics, we need reviewers who are able and willing to review manuscripts on a variety of topics. Reviewers who can or will only review a narrow scope of topics are not helpful to us. It is not fair to other reviewers, who have to carry a larger share of the workload. On the average, each Board member reviews one manuscript per month, but some months there may be more.

As I indicated in my statement in the February 1997 issue, the incoming Editorial Board of 45 members was based primarily on the input of Angelo

DeNisi and our own knowledge of these scholars. I also indicated that I would be making further appointments to the Board to handle the vast volume of manuscripts. Therefore, the associate editors and I developed the process described above to nurture potential Board members. In the past nine months, a number of these "potentials" emerged by consistently performing at superior standards. I am very pleased and proud to announce the appointment of seven new members to the Editorial Board of the *Journal*. Their names appear in the Editorial Board list in this issue. The seven new members are:

Neal Ashkanasy, The University of Queensland
M. Tina Dacin, Texas A&M University
Richard Johnson, University of Missouri
Rita McGrath, Columbia University
Nandini Rajagopalan, University of Southern California
Sandra Robinson, New York University
Steven Sommer, University of Nebraska-Lincoln

Many of these new members have been ad hoc reviewers for the *Journal* for a long time, and they have all reviewed for the new editorial team enough times that we have personal experience with their excellent review performance. We welcome them to the Board and look forward to their valuable contributions to the review process over the next few years.

If you are a current ad hoc reviewer and would like to contribute more to the review process, please let us know. Reviewing is critical for the development of our field, and good reviewers contribute their time without necessarily being fully recognized in their formal academic reviews at their universities. It is truly one of the most valuable and intrinsically rewarding "extra-role behaviors" of an academic.

The editorial team is interested in expanding the composition of the Board in terms of both research areas and geography. For example, including the new appointments, we now have 5 Board members (out of a total of 52) who are from non-U.S. universities, including 2 from Israel, 2 from Australia, and 1 from Canada. There is one more factor that you should be aware of: No one scholar can serve for both *AMJ* and *AMR*. This restriction is to ensure that we spread the responsibility; realistically, we would not expect anyone to be able to review for both journals, given the workload involved.

I hope the above clarifies the process of appointment to the Editorial Review Board of the *Academy of Management Journal*. There is really no "mystery" as such, but we are pleased to make the process more transparent. Membership on the Board signifies and implies a strong commitment to participating in the knowledge creation process. This is an awesome responsibility, and I believe the current Board is taking this responsibility seriously in action and spirit. To all our reviewers, Board members, and ad hoc reviewers, thank you for your service and time.

Anne S. Tsui
Hong Kong

THE EMERGENCE AND PREVALENCE OF EMPLOYEE MANAGEMENT RHETORICS: THE EFFECTS OF LONG WAVES, LABOR UNIONS, AND TURNOVER, 1875 TO 1992

ERIC ABRAHAMSON
Columbia University

Five employee management rhetorics have swept U.S. managerial discourse over the last century: welfare work, scientific management, human relations and personnel management, systems rationalism, and organization culture and quality. I tested two competing theses: the performance-gap thesis, according to which the popularity of rhetorics that promise to narrow organizational performance gaps fluctuates with the magnitude of these gaps across organizations, and the pendulum thesis, according to which the popularity of these rhetorics has been related to upswings and downswings in long waves of macroeconomic activity. I measured rhetorics' popularity between 1875 and 1992 using yearly counts of articles. Results suggest that the two theses are in fact complementary.

Most students of techniques for managing employees know that the scientific management movement gave way to the human relations and personnel management movement during the 1920s and 1930s. Most are also familiar with each movement's employee-management rhetoric:[1] what participants in the movement said and wrote to justify the use of particular techniques for managing employees. The scientific management rhetoric touted a variety of employee management techniques with the promise that they would increase labor productivity by streamlining and rationalizing work processes and by appealing to employees' economic self-interest. The human relations and personnel management rhetoric championed a bevy of techniques with the promise that they would raise both labor satisfaction

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[1] The term "rhetoric" can carry two different meanings. First, it can suggest that what is being said or written is not really believed by the speaker or writer. Second, "rhetoric" is language used to persuade. I use the term in this second sense only (Zbaracki, 1994).

and productivity by satisfying employees' social and psychological needs (Guillén, 1994; Jacoby, 1985; Kaufman, 1993; Wren, 1987).

What most students of employee management techniques know less well, however, are possible answers to the following questions: Why do new employee management rhetorics emerge when they do, and what explains their postemergence prevalence? Why, for example, has the management community been exposed since the 1970s to a torrent of articles, all with a strong human relations flavor, describing and justifying a host of techniques such as T-groups, corporate culture, quality circles, teams, and TQM, to name a few? What explains the recent explosion in the number of articles disseminating strikingly different ideas, such as downsizing and the reengineering of corporations and governmental agencies?

Addressing such questions is important for at least three reasons. First, employee management rhetorics provide the ideas and vocabularies with which managers can communicate legitimate accounts of how they manage their employees (Meyer & Rowan, 1977). Second, new rhetorics may trigger the widespread diffusion of new employee management techniques, and rhetorics' persistence may foster the continued use of these techniques (Stinchcombe, 1965; Strang & Meyer, 1994). Third, scholars need to know whether or not such rhetorics are useful adaptations to changing environmental conditions (Abrahamson, 1991). This knowledge would help students of management techniques decide whether to attempt and enrich these rhetorics or go about debunking them (Abrahamson, 1996). In sum, since employee management rhetorics may greatly influence what both students and users of employee management techniques say, write, and do, an understanding of forces influencing their emergence and prevalence is an important objective for research. Toward this end, this study tested two competing theses. According to the performance-gap thesis, the popularity of rhetorics that promised to narrow certain organizational performance gaps fluctuated in response to the prevalence of these performance gaps in organizations. In contrast, according to the pendulum thesis, the popularity of rhetorics has been related to upswings and downswings in long waves of macroeconomic activity (Barley & Kunda, 1992; DeGreene, 1988; Gill & Whittle, 1993).

THE PERFORMANCE-GAP AND PENDULUM THESES

Performance Gaps

Managers aspire to reach a variety of performance targets: specific levels of financial performance, of voluntary employee exit (voluntary turnover), and of labor unionization, for example. An environmental change can create a similar performance gap among organizations—a discrepancy between the levels of performance managers in these organizations aspire to and the levels they actually do attain. A number of labor historians have argued that managers gain and retain interest in rhetorics that suggest ways of narrowing

particular performance gaps. Conversely, environmental changes that narrow such gaps reduce managers' interest in these rhetorics. In sum, the widening and narrowing of performance gaps may influence the prevalence of employee management rhetorics that promised to narrow these gaps.

Pendulum Swings

Table 1 summarizes the key points of the pendulum thesis; it should be noted that the thesis applies to more than the transition from scientific management to human relations/personnel management. It covers the pre–scientific management emergence of the welfare work rhetoric, named for the specialized welfare workers who sought to increase employees' welfare and output and shape their values. The pendulum thesis also pertains to the post–human relations emergence of two rhetorics: The systems rationalism rhetoric, which emerged during the 1950s and advocated the use of techniques for rationalizing production, such as statistical quality control, management by objectives, and cost benefit analysis (Waring, 1992; Wren, 1987), and the organization culture and quality (culture–quality) rhetoric, which emerged during the 1970s and advocated the use of techniques like building a corporate culture (Barley, Meyer, & Gash, 1988) and adopting one of a broad array of techniques falling under the total quality management umbrella.

The pendulum thesis has three parts. First, it suggests that all five rhetorics fall into two classes: rational rhetorics and normative rhetorics. According to rational rhetorics, work processes can be formalized and rationalized to optimize labor productivity, as can the reward systems that guarantee recalcitrant employees' adherence to these formal processes. Scientific management and systems rationalism are classified as rational rhetorics. According to normative rhetorics, employers can render employees more productive by shaping their thoughts and capitalizing on their emotions. Welfare work, human relations, and culture-quality are classified as normative rhetorics.

Second, the pendulum thesis suggests that rational and normative rhetorics are irreconcilable. Consequently, new rational and normative rhetorics can never emerge simultaneously, but must instead emerge in a pendulum-like alternation.

Third, the pendulum thesis suggests that pendulum swings are *not* triggered by performance gaps. Barley and Kunda (1992) based this counterclaim on historical research indicating that certain rhetorics emerged when the performance gap thesis suggested they should not have, whereas other rhetorics did not emerge when they should have. According to the pendulum thesis, pendulum swings instead occur in conjunction with long waves, which are 50-year cycles of macroeconomic expansion and contraction (Kondratieff, 1935). New rational rhetorics emerge around the onset of each long-term expansionary upswing of a wave, whereas new normative rhetorics emerge around the onset of each long-term contractionary downswing.

TABLE 1
Pendulum Thesis

Characteristic	Second Kondratieff Long Wave		Third Kondratieff Long Wave		Fourth Kondratieff Long Wave	
	1847–1872	1872–1894	1894–1921	1921–1944	1944–1971	1971–Present
Long wave stage	Upswing	Downswing	Upswing	Downswing	Upswing	Downswing
Type of rhetoric		Normative rhetoric	Rational rhetoric	Normative rhetoric	Rational rhetoric	Normative rhetoric
Name of rhetoric		Welfare work	Scientific management	Human relations/ personnel management	Systems rationalism	Organization culture and quality

The pendulum thesis has several promising features. First, it brings up to date the history of employee management rhetorics by recognizing the post–World War II emergence of two rhetorics (systems rationalism and culture-quality). Second, it does so in a single framework that reveals similarities in rhetorics from different periods, allows their classification as rational or normative, and ties their emergence to the same causes (long waves). One appraisal of the pendulum thesis is that it highlights a transhistorical causal relationship between long-term macroeconomic conditions and the prevalence of employee management rhetorics over the last 100 years. An even more enthusiastic appraisal is that the pendulum thesis is a tool for forecasting what type of rhetoric might become fashionable when (Abrahamson, 1996).

Like any far-reaching thesis, the pendulum thesis opens up as many interesting and debatable theoretical and empirical questions as it answers. On the theoretical side, the pendulum thesis does not clearly indicate whether and why the emergence of employee-management rhetorics should lead or lag the onset of long waves. Moreover, it suggests unclear propositions concerning rhetorics' postemergence prevalence. In particular, it is unclear whether a rhetoric that emerges around a particular stage of a long wave (an upswing or a downswing) remains prevalent only throughout this stage or persists when the stage has ended. If a rhetoric does persist, is its postemergence prevalence affected by sudden environmental jolts, such as wars or fluctuations in widespread organizational performance gaps, such as those presumably caused by labor union activity?

On the empirical side, Barley and Kunda (1992) induced their theory using both the work of historians and yearly counts of systems rationalism and culture-quality articles listed in the *Business Periodicals Index* between 1958 and 1990. They did not, however, use the full time series belonging to this index, which begins in 1913. Moreover, they provided little indication of the validity and reliability of these bibliometric data and did not use statistical techniques to analyze them. Consequently, Barley and Kunda (1992) rejected, without a clear empirical test, the performance gap thesis that labor union activity influenced the popularity of rhetorics. Moreover, they did not control for other historical jolts—wars, government legislation—that, many scholars have argued, affect the prevalence of rhetorics (Baron, Dobbin, & Jennings, 1986; Guillén, 1994; Jacoby, 1985; Kaufman, 1993; Kochan & Cappelli, 1984; Kochan, Katz, & McKersie, 1994; Shenhav, 1995).

The reported research had three objectives: (1) to test the performance-gap and pendulum theses using the full span of the *Business Periodicals Index,* from 1913 through 1992, as well as earlier article counts spanning the 1875–13 period, (2) to examine what factors influenced the postemergence prevalence of rhetorics, using statistical analysis when appropriate, and (3) to explore the validity and reliability of bibliometric data in measuring the emergence and postemergence prevalence of employee management rhetorics.

THEORY AND HYPOTHESES

The Pendulum Thesis

As noted, several management scholars have recognized two contradictory types of employee-management rhetorics[2] (Guillén, 1994; Kaufman, 1989, 1993; McGregor, 1960; Scott, 1992). Barley and Kunda (1992) used the terms "rational" and "normative" to distinguish these two types.

Rational rhetorics. The key assumption underlying rational rhetorics is that work processes can be formalized and rationalized to optimize productivity, as can the reward systems that guarantee recalcitrant employees' adherence to these formal processes. Rational rhetorics conceive of employees as largely averse to both responsibility and work. Like cogs in a machine, employees are assumed to turn out work only because the formalized structures of machine- or system-like organizations control their actions and reward their efforts. The role of management, therefore, is to engineer or reengineer organizational machines and systems to optimize production processes and to reward employees for adhering to such processes. The management techniques championed by rational rhetorics are blueprints for formalizing and rationalizing employee management processes and rewards to maximize organizational goal attainment.

This rational streak appears clearly in the scientific management rhetoric (Litterer, 1963; Locke, 1982; Nelson, 1975, 1980). As Perrow succinctly put it, the goal of scientific management was to analyze jobs very carefully into their smallest aspects, scrutinize the capabilities of the human machine just as carefully, and then fit the two together to achieve the greatest economy. Job techniques would be redesigned to make maximum use of human abilities; humans would be trained to perform the jobs optimally (1986: 57). The scientific management rhetoric advocates the achievement of these goals through the use of a combination of techniques that include time studies, motion studies, rate setting, job analyses, piece rates, and work measurements.

This rational streak is also apparent in the systems rationalism rhetoric that emerged in the 1950s and contained diverse camps—operations research, management science, and contingency theory—unified by a common

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[2] A caveat is in order before discussing the distinction between normative and rational rhetorics. Employee management rhetorics are different types of widely spoken and written discourses justifying the use of particular sets of techniques for managing employees. Thus, any speech or writing about the management of employees is not an employee management rhetoric. It must also be a (1) *widely* spoken or written discourse that specifies (2) a *set* of (3) similar *techniques* useful to managers for (4) managing *employees* in organizations. Consequently, this study, like others before it, focuses on rhetorics that (1) were not confined to small linguistic subcommunities, (2) describe a multiplicity of similar techniques, (3) have a managerialist and normative component and are not just disinterestedly scholarly and descriptive, and (4) pertain to the management of employees in organizations rather than the management of the strategies guiding these organizations (see Bendix [1959: 1–21] and Guillén [1994: 8] for similar approaches).

approach. The common metaphor across this new rational rhetoric was not the organization as machine and the employee as cog, but rather the organization as system and the employee as node. The overarching theme of systems rationalism, like that of scientific management before it, was the formalization and rationalization of work processes and rewards in order to achieve organizational goals (Waring, 1992).

Perhaps because new techniques such as reengineering have sprung up only very recently, Barley and Kunda (1992) remained silent about them. Both their names and their contents seem to place these approaches squarely in the rational rhetoric classification. I return to them below.

Normative rhetorics. As was noted, the key assumption underlying normative rhetorics is that employers can render employees more productive by shaping their thoughts and capitalizing on their emotions. The organizational metaphor of normative rhetorics is the human collective, whether it be the family in the welfare work rhetoric, the group in the human relations and personnel management rhetoric, or the culture and team in the organization culture and quality rhetoric. Employees are assumed to have thoughts and social and psychological needs. The satisfaction of employees' needs by organizations, teams, and their leaders not only causes employees' personal satisfaction, trust, and loyalty, but also unleashes powerful drives in them to achieve the collective's goals and to freely, creatively, and continuously improve the processes necessary to achieve these goals. The role of managers, then, is to meet employees' needs and channel the unleashed motivational energy through a clear vision and a strong culture. Therefore, normative rhetorics prescribe methods of hiring and promoting employees with the right cognitive and psychological profiles and prescribe techniques to satisfy employees' psychological needs with benefits, enriched tasks, and empowering management styles. They offer ways to survey and shape employees' thoughts and loyalties with visionary leadership and organizational cultures in order to channel the motivational energy and creativity that these techniques unleash.

The first normative employee management rhetoric in the United States was industrial betterment, or welfare work. Welfare work techniques were defined in 1919 by the Bureau of Labor Statistics as "anything for the comfort and improvement, intellectual or social, of the employees, over and above wages paid, which is not a necessity of the industry nor required by law" (Bureau of Labor Statistics, 1919: 37). The welfare work rhetoric championed the use of a wide variety of employee management techniques that fell into two categories (Bernstein, 1966; Brandes, 1970; Brody, 1968; Buder, 1967; Bureau of Labor Statistics, 1919). The first type of technique was designed to shape employees' values, intellectual skills, and work ethics. Such ventures as creating company schools, launching employee magazines, and funding company churches were advised. The second type of technique was designed to promote the physical welfare of employees and thus increase their well-being, satisfaction, organizational loyalty, and ultimately, their productivity. The welfare work rhetoric advocated that employers

build towns and offer lunches to assure adequate living standards for employees. It also championed the use of employee representation and participation in management to keep employees involved. By the mid-1920s, the rhetoric promoted the use of welfare work techniques that incorporated financial incentives. These new techniques included profit-sharing and employee-stock-ownership programs, which were intended to align the objectives of employees and their organizations (Jacoby, 1985).

The second normative rhetoric, which emerged during the 1920s and 1930s, has been called the human relations/personnel management rhetoric. Under this label fall not only the writings of academics in the fields of human relations and industrial relations, but also, more importantly, those of specialists in a profession first called employee management, then personnel management, and currently, human resource management (Baron et al., 1986; Jacoby, 1985; Kaufman, 1993; Kochan & Cappelli, 1984; Kochan et al., 1994; Montgomery, 1987). At first, these specialists advocated techniques such as ability tests for hiring employees, and they devoted special attention to record-keeping techniques (Eilbert, 1959). Over time, personnel management specialists described techniques for interviewing employees, polling their opinions, rating them, and regularizing their promotions (Jacoby, 1985).

A third normative rhetoric emerged in the 1970s: organizational culture and quality. Under this label, coined by Barley and Kunda (1992), those authors placed writings of both academics and consultants stressing transformational leadership, strong employee values, and shared beliefs as the path to increased labor productivity. They also included work on total quality management (TQM) under this designation.[3]

The Sequencing of Rhetorics' Emergence

Fundamental differences distinguish rational from normative rhetorics. Whereas the root metaphors of rational rhetorics are nonhuman entities, such as the machine and the system, the root metaphors of normative rhetorics are human collectivities, such as the family, group, team, and culture. Whereas rational rhetorics describe a manager as an objective and calculating human engineer, normative rhetorics beseech managers to be humane, caring, and visionary leaders. The assumption underlying rational rhetorics is that rationalized formal structures are necessary to guide and motivate employees with extrinsic rewards, whereas the normative assumption is that

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[3] Although Barley and Kunda (1992) did not discuss why they classified TQM as part of a normative rhetoric, recent historical research bears out their claim. The writings about forerunners of TQM produced during and immediately after World War II do have a very strong rational flavor and belong clearly to the systems rationalism rhetoric of the time (Kolesar, 1995). The TQM arguments in Deming's (1986) later work, however, are less a rational rhetoric of statistical quality control than a normative rhetoric of teams, empowerment, and trust. Moreover, recent research indicates that the popularization of TQM in the business press almost completely does away with the rational, statistical quality control side of TQM (Hackman & Wageman, 1995).

employees have the capacity to find intrinsic rewards through work, to set their own direction, and to be self-controlling.

A key assumption of the pendulum thesis is that, because of their fundamental differences, rational and normative rhetorics are irreconcilable. According to the thesis, therefore, these rhetorics function like cultural antinomies. Both have appeal, but their incommensurability drives sequential emergence of interest in first one and then the other. The pendulum thesis suggests the following two hypotheses:

> *Hypothesis 1. New rational and normative employee management rhetorics will emerge in different periods.*

> *Hypothesis 2. New rational and normative employee management rhetorics will emerge in an alternating sequence.*

Long Waves and the Timing of Rhetorics' Emergence

The cultural antinomy argument implies sequencing in the emergence of normative and rational rhetorics. It cannot explain, however, when rhetorics will emerge. The pendulum thesis suggests that long waves (50-year cycles of macroeconomic activity) influence the timing of the sequential emergence of rational and normative rhetorics (Barley & Kunda, 1992; De-Greene, 1988; Gill & Whittle, 1993). I begin by discussing evidence for long waves, then turn to recent theorizing explaining their occurrence, and finally discuss how they might influence the popularity of employee management rhetorics.

The case for long waves. As early as 1847, Hyde Clark noted the existence of long waves of macroeconomic activity, which he estimated as having a 54-year periodicity (Schumpeter, 1935). Kondratieff (1935) used a two-step statistical technique to reveal long waves in economic time series with a secular trend. First, he used the least-squares method to fit a trend line through the series. Second, the trend line was subtracted from the original series and the residuals used to create a detrended series. Third, shorter-term fluctuations in the detrended series were smoothed out using a 9-year moving average.

Long wave research virtually ceased in the post–World War II period. This was due both to Garvy's (1946) influential summary of critiques of current techniques for finding long waves and to a general disinterest in research predicting long-term macroeconomic downswings during this period of rapid, sustained macroeconomic upswing. Interest in long waves resurged, however, when people sought to explain the sustained economic downturn of the 1970s, '80s, and '90s. With this resurgence came a new generation of scholars who countered Garvy's (1946) critiques and detected long waves in real output using the new statistical techniques of spectral analysis (Haustein & Neuwirth, 1982; Reijnder, 1990) and chaos theory (Berry, 1991; Berry, Kim, & Kim, 1993). Moreover, computer simulation of macroeconomic processes also reproduced long wave patterns with a roughly 50-year periodicity (Forrester, 1979). Finally, the case for long waves

was bolstered by the work of a number of historians who found them useful in explaining long-term historical transformation (e.g., Gordon, Edwards, & Reich, 1982; Hobsbawm, 1994).

The Neo-Schumpeterian theory of long waves. As was the case with long wave research, acute interest in long wave theorizing spurred by Kondratieff's (1935) and Schumpeter's (1935) theories gave way to active disinterest during the 1950s and 1960s. Kuznets (1940) in particular criticized Schumpeter for failing to provide either evidence supporting the claim that innovations cluster at the trough of long waves (thereby impelling the next upswing) or a theory explaining why they might do so. More recently, researchers using variations of Schumpeter's (1935) theory have countered Kuznets's critique and dominated the revival of long-wave theorizing designed to explain the persistent worldwide slowdown in many industrialized economies that began in the 1970s.

These Neo-Schumpeterian explanations share four features (Ayres, 1990a, 1990b; Freeman, 1974; Freeman, Clark, & Soete, 1981; Haustein & Neuwirth, 1982; Kleinknecht, 1987, 1990; Mensch, 1979; Rosenberg & Frischtak, 1984; VanDuijn, 1983). First, they distinguish radical scientific inventions from the commercialization of these inventions, which they call innovations—new commodities, productive processes, markets, raw materials, or forms of business organization. Second, as Figure 1 indicates, a growing body of evidence indicates that whereas inventions appear randomly during long waves, innovations cluster before the time when the downswing in a long wave reaches the wave's trough (Freeman et al., 1982; Kleinknecht, 1987, 1990; Mensch, 1979).

The Neo-Schumpeterian explanation for such innovation clustering is that when economic conditions are somewhat favorable (during the upswing of a long wave, and early in the downswing), companies focus R&D efforts on refining existing innovations, not on commercializing new ones. It is only as economic conditions worsen (late in the downswing) that companies and entrepreneurs take the large risks involved in commercializing inventions (Kleinknecht, 1987; Mensch, 1979). Third, when they do take these risks, clusters of complementary innovations engender entirely new economic sectors that lead the expansions that impel long wave upswings.[4] Long wave upswings end, however, when the innovations that propelled them reach a point of sharply diminishing returns, which initiates the downswing phase of long waves. Downswings push economic activity to a low point at which

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[4] Ayres (1990), for example, argued that the shift from charcoal to coal as the dominant industrial fuel engendered and sustained leading sectors—iron making, steam engines, canals, and mechanized cotton spinning—responsible for the first Kondratieff long wave upswing. Steam power engendered sectors (textiles, railways, steam boats) responsible for the second long wave upswing. Steel making, the mechanization of manufacturing, illumination, telephones, electrification, and internal combustion engines powered the third long wave upswing. Synthetic materials and electronics impelled the fourth, and computers and telecommunications the fifth.

FIGURE 1
Inventions and Innovations
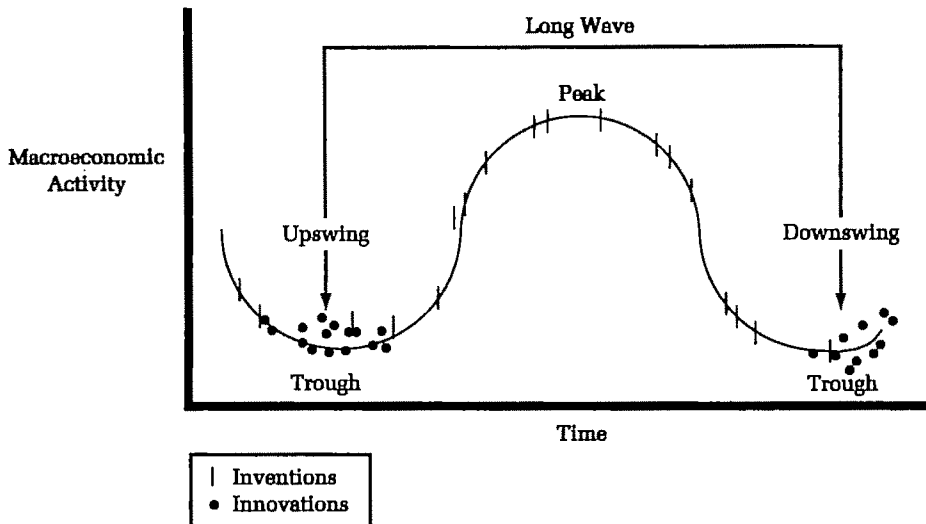
firms are willing again to take innovative risks and when, consequently, a new cluster of innovations triggers a renewed round of expansion in the long wave cycle. In short, in Neo-Schumpeterian theories of long waves, innovations are a key endogenous force impelling long waves.

Long waves and rhetorics' emergence. How do the upswings and downswings of long waves influence employee-management rhetorics? Barley and Kunda (1992) argued that upswings in long waves tended to coincide with the emergence of rational employee management rhetorics. They accepted the Neo-Schumpeterian claim that innovation clusters drive long wave upswings. They went on to assert that "it stands to reason that managers should be attracted to rhetorics that emphasize rational procedures and structures when profits hinge easily on capital investment and automation" (1992: 391). They did not fully clarify why they made this claim. Nor does this claim indicate whether and why the emergence of employee management rhetorics should lead or lag the onset of long waves.

A number of scholars have argued that the innovation clusters that cause long wave upswings do not only contain technological innovations; these clusters also contain the managerial innovations needed to rationalize the production process in ways that allow exploitation of these technological innovations (Gordon et al., 1982; Tylecote, 1992, 1994). In order to innovate and cause long wave upswings, organizations depend on engineers and scientists, and consequently, such individuals ascend to positions of authority in these organizations (Fligstein, 1990). Engineers and scientists need management techniques to fit employees to new technological innovations, and

they are receptive to the machine and system metaphors used in rational rhetorics to describe and justify the use of techniques that could serve this purpose.

In sum, Neo-Schumpeterians suggest that it is sustained long wave downturns that trigger the emergence of innovation clusters. These clusters contain both technological innovations and a new rhetoric suggesting rational management techniques for fitting employees to these technological innovations. These clusters of innovative technologies and rational management techniques then trigger the next long wave upturn. These arguments suggest the following:

> *Hypothesis 3. New rational rhetorics will tend to emerge shortly before the end of long wave downswings.*

Hypothesis 3 dovetails neatly with historical accounts revealing that techniques championed by the scientific management rhetoric gained popularity with the end of a long wave downswing occurring at the turn of the century (Chandler, 1977; Litterer, 1963; Locke, 1982; Nelson, 1975, 1980) and that rational techniques championed by the systems rationalism rhetoric gained popularity with the end of the long wave downswing occurring around World War II (Nelson, 1992; Waring, 1992).

What happens when long wave upswings approach their peaks? Barley and Kunda (1992) accepted the Neo-Schumpeterian argument that during the late part of long wave upswings, innovation clusters yield diminishing returns. They asserted that "when returns on capital begin to decline, managers should show greater interest in rhetorics that focus on the utilization of labor, industry's second factor of production" (1992: 391). They provided little justification for this assertion, however.

One possible justification is Kimberly's (1981) argument that the demand for normative employee management techniques is like the demand for inferior goods—for instance, demand for potatoes increases during economic downswings because they are a cheap substitute for a superior good, meat. Likewise, normative productivity-enhancing techniques are cheap substitutes for rational productivity-enhancing techniques during long wave downturns. Employers hope to achieve low-cost productivity increases through normative techniques, by capitalizing on employees' thoughts and emotions, rather than by using the costly financial incentives and work redesigns advocated in rational rhetorics.

In sum, the diminishing returns of innovation clusters cause a slowdown in macroeconomic growth, triggering the emergence of rhetorics promoting normative techniques. Alone, these normative techniques cannot counteract diminishing returns, and a long wave downturn results. Therefore,

> *Hypothesis 4. New normative rhetorics will tend to emerge shortly before the end of long wave upswings.*

Employee management rhetorics' postemergence prevalence. The pendulum thesis explains the emergence of employee management rhetorics,

but it does not explain their postemergence prevalence. In particular, it is unclear whether rhetorics disappear at the ends of the stages of long waves during which they arose or persist past the ends of those stages. Barley and Kunda (1992) described "surges" in rhetorics that coincided with turning points in long waves and "challenges" to each rhetoric that coincided with the next turning point. This formulation could suggest that rhetorics remain prevalent only during the stage of a long wave that triggered them. Such an interpretation, however, contradicts another part of Barley and Kunda's article, in which they stated that "unlike a passing fad, the five rhetorics with which we are concerned have never disappeared" (1992: 365). This passage suggests that rhetorics outlive the long wave stage in which they arose.

It is also unclear what explains the prevalence of rhetorics during the long wave stages during which they arose and if they survive those stages. Barley and Kunda's (1992) evidence suggests that labor union activity did not influence the emergence of certain rhetorics. But it still remains possible that periods of heightened labor union activity, or some other historical event, might have influenced rhetorics' postemergence prevalence. I focus on this possibility in the next section.

The Performance-Gap Thesis

The performance-gap thesis is that the popularity of rhetorics that promise to narrow certain organizational performance gaps fluctuates in response to their prevalence. Historians point to two types of performance gaps: (1) gaps between aspired-to and actual levels of voluntary employee exit (voluntary turnover) and (2) gaps between aspired-to and actual levels of labor union activity. This section advances hypotheses derived from this performance-gap thesis about how the widening and narrowing of these gaps across organizations might influence the prevalence of employee management rhetorics that promise to narrow these gaps.

A high rate of voluntary turnover among employees reveals widespread poor performance in retaining employees. The promise of normative rhetorics is that employee satisfaction will be increased, which will help managers reduce turnover (Brandes, 1970; Jacoby, 1985; Slichter, 1919). It follows that

> *Hypothesis 5. The prevalence of normative rhetorics will be directly related to the voluntary turnover rate across organizations.*

Rational rhetorics, like scientific management or systems rationalism, typically do not promise to reduce labor turnover. Thus,

> *Hypothesis 6. The prevalence of rational rhetorics will be unrelated to the voluntary turnover rate across organizations.*

Gaps between the actual amount of labor union activity and the amount managers hope for may cause increases in the prevalence of normative em-

ployee management rhetorics. This relation would occur because the promise of normative rhetorics is that managers will forestall the discontentment that causes employees to join labor unions and strike (Edwards, 1979; Gordon et al., 1982; Jacoby, 1985, 1991; Marglin, 1974; Nelson, 1975; Perrow, 1986; Stone, 1974). It follows that

> *Hypothesis 7. The prevalence of normative rhetorics will be directly related to the amount of labor union activity across organizations.*

It is unlikely that the prevalence of rational rhetorics would be related to the amount of labor union activity. It is true that Taylor asserted that scientific management might also improve labor relations indirectly by aligning employees' and managers' interests: employees get better pay and managers get greater productivity (Nelson, 1975; Taylor, 1911). Shenhav (1995) found evidence for this claim in data on the period between 1879 and 1932. It is unlikely, however, that this part of the scientific management rhetoric was widely believed in the period I studied. Indeed, in 1911, introduction of scientific management techniques at a large arsenal caused a large-scale worker walkout and a highly publicized congressional investigation. Baron and colleagues' (1986) study of the diffusion of scientific management techniques also indicates that these techniques actually fueled, rather than forestalled, unionization in many industries.[5] Moreover, another rational rhetoric, systems rationalism, contains no promises to forestall labor union activity. Thus,

> *Hypothesis 8. The prevalence of rational rhetorics will be unrelated to the amount of labor union activity across organizations.*

METHODS

Independent Variables

Control variables. Lindblom (1977) advanced a theory of the state that suggests that during wars, government officials attempt to maintain the goodwill of workers and thus sustain production by backing techniques that increase workers' satisfaction. Historians have found such backing on the part of World War I and World War II war labor boards and argued that it influenced the popularity of certain normative rhetorics (Baron et al., 1986; Brandes, 1976; Jacoby, 1985; Harris, 1982). Consequently, I controlled for the impact of World War I and II war labor boards on the prevalence of employee

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[5] It is not customary to advance null hypotheses in the organization sciences, even though a number of prominent scholars have argued forcefully that it is legitimate to do so (e.g., Greenwald, 1975; Webster & Starbuck, 1988). I advanced null hypotheses in this study for two reasons: (1) because doing so was a logical extension of the theory I was testing and (2) because I was not hypothesizing that all relations would be null, only those bearing on rational employee management rhetorics.

management rhetorics, using a dummy variable coded 1 for the periods 1917–18 and 1941–45, the years during which the boards were in operation, and 0 for other periods (Jacoby, 1985).

Certain writers have deemphasized the effect of short-term fluctuations in labor union activity on the popularity of employee management techniques (Baron et al., 1986; Jacoby, 1985; Kaufman, 1993; Kochan & Cappelli, 1984; Kochan et al., 1994). They have focused instead on turning points in labor union activity prompted by changes in laws governing unions, arguing that the Wagner Act of 1935 in particular signaled the state's full backing of unions in the early 1930s. Managers strove to avoid or counter pressures exerted by labor unions, and the government's backing of unions may have forced these managers to develop ways of accommodating labor's new powers. In particular, managers may have gained interest in normative rhetorics because they promised to raise worker satisfaction and thus minimize the discontent that fosters labor union activity. Consequently, in these analyses I controlled for the effect of the passage of the Wagner Act on the prevalence of employee management rhetorics using a dummy variable coded 1 for the period 1935–41 and 0 for other periods. After 1941, the United States moved into a wartime economy, and forces other than the Wagner Act had a dominant effect on labor union activity.[6]

Scholars have pointed to yet another era of government intervention, that occurring between the 1960s and the 1980s, as a possible influence on the prevalence of normative employee management rhetorics, particularly the human relations/personnel management rhetoric (Kochan & Cappelli, 1984; Kochan et al., 1994). Kochan and Cappelli asserted that "perhaps the most important force for change in the personnel-industrial relations function in the period since 1960 has been the rise of government regulation in the workplace" (1984: 146). Government intervention to discourage employment discrimination was initially sanctioned by the passage of Title VII of the Civil Rights Act of 1964 and continued to grow during the 1960s and 1970s. The primary responsibility for meeting government requirements fell to a growing and newly empowered cadre of personnel management professionals who embraced normative employee management rhetorics. Thus, I controlled for the passage of the Civil Rights Act of 1964 on the prevalence of employee management rhetorics, using a dummy variable coded 1 for the period 1964–80 and 0 for other periods. The 1980 cut-off was based on historical accounts of the period indicating that enforcement of the act became much laxer after Ronald Reagan's election in 1981 (Kochan & Capelli, 1984; Kochan et al., 1994).

Labor union activity and labor turnover. Researchers have measured private sector labor union activity in varied ways: union foundings, the

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[6] There is no good way to determine the duration of each event's impact on employee management rhetorics. Consequently, a number of dummy variable specifications were tested. The results were not substantially different from those reported here.

percentage of employees belonging to unions, and the frequency of strikes (Stern, 1978). Foundings and unionization declined drastically after World War II (Hannan & Freeman, 1977; Freeman & Medoff, 1984: 222). The frequency of strikes, however, remained comparatively high. Consequently, I examined the impact of both unionization (the national percentage of employees belonging to labor unions) and strike frequency nationwide. Yearly data on unionization, the frequency of strikes involving more than six employees, and on the voluntary turnover rate per 100 employees were drawn from the U.S. Bureau of the Census *Historical Statistics of the United States* for the 1914 to 1970 period and from the U.S. Department of Labor's *Handbook of Labor Statistics* thereafter.[7]

Dependent Variables

Bibliometric indicators. I used two data sources to trace the emergence of the scientific management rhetoric (see Figure 2). Litterer (1959) counted the number of articles, across all U.S. periodicals, belonging to this rhetoric and appearing between 1875 and 1900. These data are not strictly comparable to my data, both because they cover a different time period and because they are not adjusted for growth in the total number of articles between 1875 and 1900. Shenhav (1995) traced the emergence of the scientific management rhetoric between 1879 and 1932. Shenhav's data are comparable to mine because he calculated the number of pages devoted to articles using this rhetoric as a percentage of the total number of pages devoted to management issues in two journals, *American Machinist* and *Engineering Magazine*.

I also developed my own bibliometric indicators and verified their validity and reliability. These bibliometric data are described first, followed by the procedure used to guarantee and check their content and construct validity, as well as their reliability. I counted 33,629 articles identified as belonging to the scientific management, welfare work, human relations/personnel management, systems rationalism, or culture-quality rhetorics in the *Industrial Arts Index* for 1913 through 1957 and in the continuations of that index, the *Business Periodicals Index* and the *Index of Applied Science and Technology,* for the years 1957 through 1992. As these three indexes are published by the H. W. Wilson Company, I henceforth refer to them as the Wilson index. Each Wilson index volume lists articles published that year on a great variety of business-related topics, including employee management. The articles are published in a broad variety of publications: business magazines, industry newspapers, and practitioner and academic publica-

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[7] In 1986, the U.S. government ceased reporting turnover rate data. In 1981, they ceased reporting data on the number of strikes involving more than 6 employees. Data on strikes involving more than 1,000 employees were reported between 1949 and 1992, however. For the period 1949–81, the two strike-frequency series correlate at .65. Therefore, for the 1982–86 period, I used the series for strikes involving more than 1,000 employees to estimate the series for strikes involving more than 6 employees.

tions. This study's article counts, therefore, indicate the prevalence of rhetorics across not one, but many, sectors: academics. consultants, mass media, and practitioners. I used the number of articles about a technique championed by a rhetoric to chart the rhetoric's emergence and prevalence.

The total number of pages in the Wilson index increased from 326 pages to 6,037 pages during the 80 years covered in this study. To adjust for this growth, I multiplied the number of articles in any one year by the ratio between the number of index pages in 1953 and the number of index pages for the given year.[8] Adjusted data for each of the five rhetorics were aggregated to produce five series: the scientific management, welfare work, human relations/personnel management, systems rationalism, and culture-quality series.

Content validity. To maximize the measures' content validity, I used a two-step sequence to measure the prevalence of each type of rhetoric. First, when possible, I used an index's thesaurus to locate the domain of techniques belonging to each type of employee management rhetoric. The second step was to select a representative set of techniques belonging to each rhetoric.

The Wilson indexes' thesauri have headings at two levels of abstraction, referred to here as root headings and branch headings. Root headings denote broad categories, such as an employee management rhetoric, and refer readers to lists of the more concrete branch headings, which might include particular techniques advocated in a rhetoric. Under each branch heading appears a list of articles on that topic. For example, the root heading "scientific management" encompasses branch headings such as "motion study" and "rate setting." Under these branch headings, the index lists articles on those employee management techniques. Summing the number of these articles in a yearly index provides a measure of the prevalence of the scientific management rhetoric in that year.

I used these root headings to locate the domain of techniques belonging to each of three rhetorics. The root heading "scientific management" appears throughout all Wilson volumes used. The two other root headings, however, underwent changes. "Employment management" changed to "personnel management" in the 1967 *Business Periodicals Index.* Historians indicate that personnel management techniques were originally called employee management techniques (e.g., Jacoby, 1985). Consequently, I used the root headings "employment management" and "personnel management" to locate branch headings denoting the human relations/personnel management rhetoric. Similarly, the root heading "welfare work" changed to "employees' benefit plans" in 1969 and to "fringe benefits" in 1974. I used these root headings to locate all branch headings denoting the welfare work rhetoric. In a few instances, a branch heading fell under two root headings. In these

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[8] This adjustment technique is analogous to the technique used by economists to transform nominal into real dollar amounts, thereby factoring out the effect of inflation.

instances, I used the work of historians to assign the branch heading to only one root. This procedure resulted in a set of 65 welfare work techniques, 40 human relations/personnel management techniques, and 15 scientific management techniques.

The focus of this study was to understand the long-run emergence and prevalence of rhetorics, rather than the emergence or disappearance of articles on a particular technique. Therefore, I selected techniques that remained in the Wilson thesauri over extended time periods, rather than techniques that were introduced and discontinued within a few years, first rank-ordering branch headings denoting techniques belonging to each type of rhetoric by the number of years they persisted as branch-headings and then selecting the top 40 percent. Root headings did not exist for two of the rhetorics studied: systems rationalism and culture-quality. For these, I used the branch headings selected by Barley and Kunda (1992).

Construct validity. It was reasoned that if the measures of the normative and rational rhetorics were distinct, then they should not correlate too highly. I expected, however, that normative rhetorics would correlate more highly among themselves. These expectations were supported for the scientific management, human relations/personnel management, and welfare work series between 1913 and 1992. As expected, the scientific management series was uncorrelated at the .05 level to both the welfare work series ($r = .22$) and the human relations/personnel management series ($r = -.17$), whereas a .30 correlation ($p < .01$) existed between these two normative series. The results were not supportive, however, for the correlation between these three series and the systems rationalism series. Contrary to expectation, between 1947 (the year of its emergence) and 1992, systems rationalism (a rational rhetoric) was not significantly correlated (.07) at the .05 level to scientific management (another rational rhetoric). Moreover, contrary to expectations, systems rationalism was strongly correlated (.48, $p < .001$) with human relations/personnel management (a normative rhetoric). According to expectations, however, systems rationalism was not significantly correlated (.22) at the .05 level to welfare work (a normative rhetoric). Results are not reported for the culture-quality rhetoric because, due to the recency of this rhetorics' emergence, the series was not long enough for statistical analysis. In sum, the results were supportive for three of the four rhetorics tested and not supportive for a fourth (systems rationalism). Their exists no clear explanation for the systems rationalism results.

Reliability. Three data sources served as reliability checks. First, I compared this study's bibliometric indicator of the emergence of the human relations/personnel management rhetoric to Hart's (1933) bibliometric indicator. Hart's data give the numbers of articles on this rhetoric per 1,000 U.S. magazine and journal articles during the periods 1905–09, 1910–14, 1915–18, 1919–21, 1922–24, 1925–28, and 1929–30. Second, I compared my bibliometric indicators of the emergence of the scientific management and human relations/personnel management rhetorics to Guillén's (1994) bibliometric indicators, which he obtained by reading all the management articles

published between 1923 and 1958 in the *Harvard Business Review* and *Factory/Industrial Management* and coding those articles belonging to the scientific management and human relations/personnel management rhetorics. Results indicate that the Hart series is consistent with the Wilson series. Results also indicate a .74 correlation between the Guillén and Wilson series for scientific management and a .65 correlation between these series for human relations/personnel management.

The National Industrial Conference Board (NICB) has carried out a number of surveys in which managers were asked to indicate whether their firms used certain employee management techniques championed by the rhetorics studied in this article (National Industrial Conference Board, 1936, 1940, 1947). For a third reliability check, I compared my study's bibliometric data to these survey data. These surveys served as a reliability check because they reflect the frequency with which managers were willing to use a rhetoric to describe how they were managing their employees. They constituted, therefore, an alternate measure of an employee management rhetoric's prevalence.[9]

Figure 2 graphically depicts evidence for the reliability of the measures used. In the top part of the figure, I joined the results of two surveys. The first, taken from Jacoby (1985), shows the percentage of firms whose managers reported using personnel departments in 1915 and 1920. The second, taken from Baron and colleagues (1986), shows this information for the years 1929, 1939, and 1945 (National Industrial Conference Board, 1936, 1940, 1947). The bottom part of Figure 2 indicates the average yearly change in the percentage of managers reporting that their firms used personnel departments over each of these periods.[10] The same figure graphs the average yearly number of articles about human relations/personnel management techniques published between 1915 and 1945.

The emergence of the human relations/personnel management rhetoric around 1915 and its resurgence in the 1940s appears in the graphs of both the survey and the bibliometric data. The relatively low prevalence of this rhetoric during the 1920s and 1930s is apparent in both types of data as well.

Surveys provide somewhat sketchier indications of the prevalence of the welfare work and scientific management rhetorics throughout the 1920–50 period. Survey and bibliometric indicators coincide. NICB surveys indicate a 15 percent increase between 1935 and 1946 in the reported use of time

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[9] Surveys of employee management practices may only be weak indicators of their actual use. Indeed, a number of organization-level studies have raised the possibility that managers' reports that they are using a technique often do not reflect how their employees are actually managed (Zbaracki, 1994).

[10] The use of rhetorics tends to become institutionalized in organizations. Therefore, I reasoned that the percentage of firms that reported using personnel departments in one period would be a strong predictor of the percentage doing so in the next period. Put differently, the percentage series would be highly autocorrelated. I therefore took the first difference of this series, to remove the effect of autocorrelation.

FIGURE 2
Evidence for Reliability of Measures

(a) Percentage of Firms Reporting
Use of Personnel Departments

(b) Bibliometric and Survey Indicators of the
Personnel Management Rhetoric
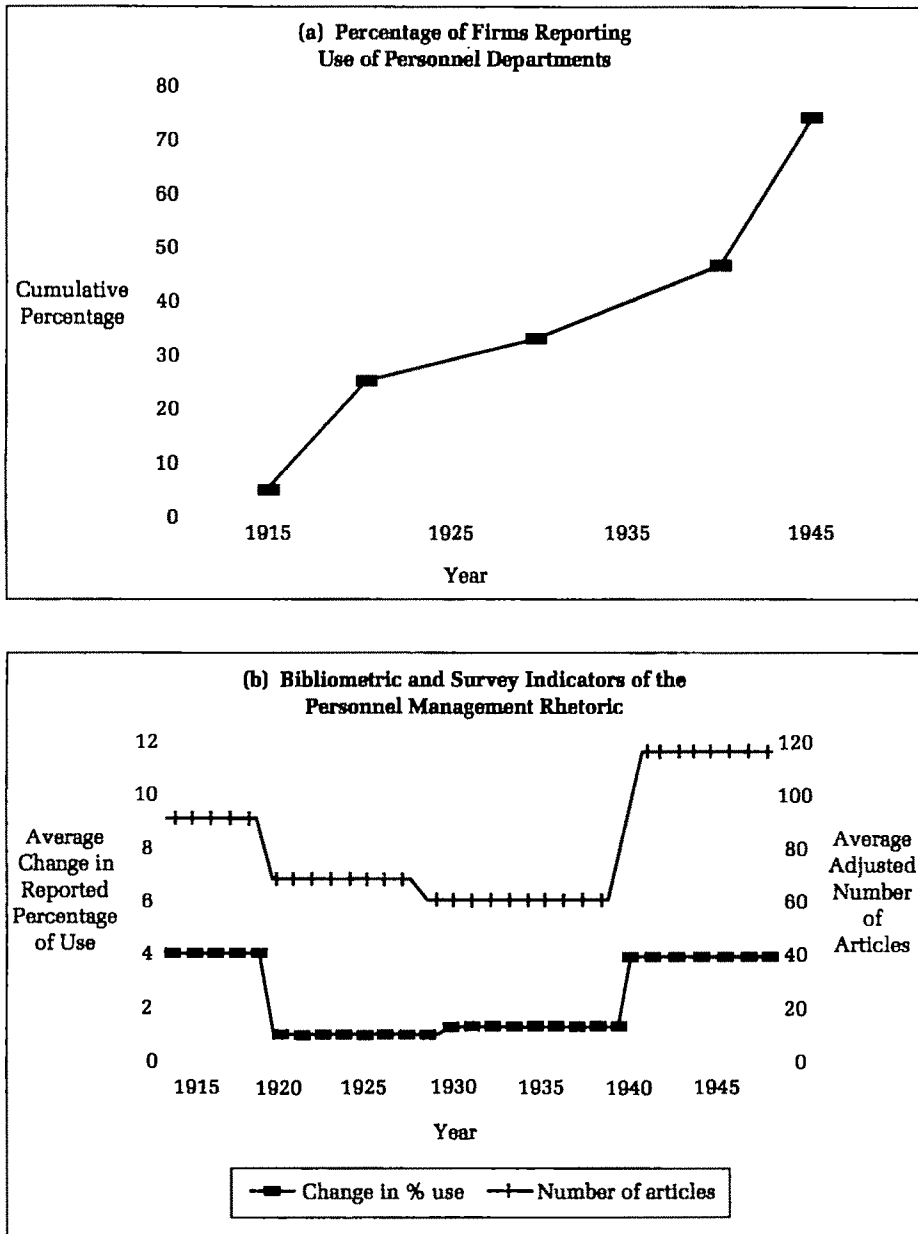
and motion scientific management techniques, and Nelson's (1991) reanalysis of these data reveals virtually no increase (Baron et al., 1986; National Industrial Conference Board, 1936, 1940, 1947). This pattern is consistent with the steady number of articles on scientific management appearing throughout this period (see Figure 6, in the Results section).

Table 2, taken from Baron and colleagues (1986), lists the percentage of welfare work programs that were discontinued between 1927 and 1935. This decline mirrors the sharp decline in the number of articles about welfare work techniques during the 1920s and 30s, which is depicted in Figure 3.

Analysis

To test Hypotheses 1 through 4, it was necessary to assess when each rhetoric emerged—that is, when its use became somewhat widespread. Clearly, this type of question involves a qualitative judgment. For Litterer's (1959) and Shenhav's (1995) article count series, I looked for sudden and sustained surges in numbers of articles. For the index count series, I reasoned that the year in which articles on a technique championed by a rhetoric began to be indexed was one indicator of the latter's widespread use. No statistical text exists to measure the beginning of a time series. Therefore, I measured the years of the emergence of a particular rhetoric by graphing the time series data on each rhetoric and examining whether the years during which articles belonging to each rhetoric began being indexed matched the hypothesized period of the rhetoric's emergence.

Hypotheses 5 through 8 bear on the prevalence of rhetorics, rather than on the timing of their emergence. I carried out hypothesis testing not only by visually inspecting graphs of the independent and dependent variable se-

TABLE 2
Discontinuation of Various Welfare Work Programs[a]

Programs	Percentage of Firms with Welfare Work Programs[b]	Percentage of Programs Discontinued[c]
Bonus, attendance	2.9	108.3
Bonus, service	7.3	40.8
Profit sharing	4.7	48.3
Suggestion system	23.1	28.1
Savings plan	15.8	16.3
Employee magazine	14.2	68.3
Cafeteria/restaurant	28.3	15.6
Athletics	47.1	25.0
Picnics, outings	33.3	23.9
Christmas gifts	19.8	39.4
Dances	21.1	15.6

[a] Table taken from Baron, Dobbin, and Jennings (1986), based on National Industrial Conference Board (1936: Ch. 2) data.

[b] $N = 2,452$.

[c] Entries reflect programs discontinued since 1927 expressed as a percentage of programs extant in 1935.

FIGURE 3
Bibliometric Evidence of the Welfare Work Rhetoric
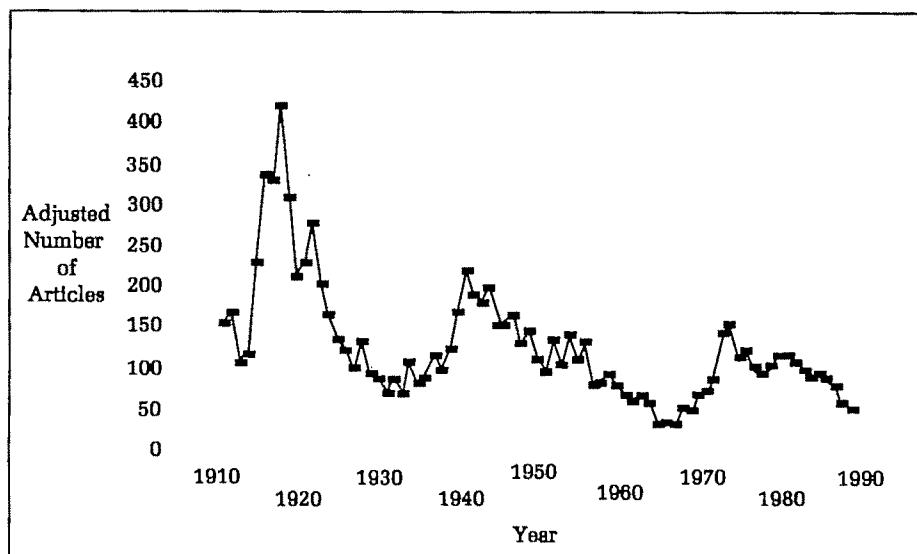
ries, but also by testing how they related using generalized least squares (GLS) multiple regression (Kmenta, 1986).[11] Statistical tests were not used on the culture-quality series because it contained too few data points. I inspected the residual series visually to detect heteroskedasticity and auto-correlation using Durbin-Watson's *d* to test for such autocorrelation.

RESULTS

The Emergence of New Employee Management Rhetorics

Table 3 summarizes the results that are graphically presented in Figures 4 and 5. I discuss first the sequence in which rational and normative rhetorics emerged and then how the timing of their emergence relates to long waves.

Sequencing. Both the Litterer (1959) and Shenhav (1995) data reveal the emergence, during the 1880s and 1890s, of a new rational rhetoric, which Litterer (1963) called systematic management and which I call scientific management. The top graph in Figure 4 reveals gradual increases in the number of scientific management articles beginning in the 1880s, and a distinct increase in their numbers in the early 1890s (cf. Litterer, 1961, 1963; Nelson, 1975).

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[11] An iterated Yule-Walker estimator was used. I also calculated results using noniterated Yule-Walker, maximum likelihood, and unconditional least squares estimators. The results did not differ substantially.

TABLE 3
Macroeconomic Long Wave Explanation

Characteristic	1894-1921	1921-1944	1944-1971	1971-Present
Macroeconomic stage	Expansion	Contraction	Expansion	Contraction
Hypothesized	Emergence of a rational rhetoric	Emergence of a normative rhetoric	Emergence of a rational rhetoric	Emergence of a normative rhetoric
Observed	1892 Emergence of a rational rhetoric: Scientific management Figure 4	1917 Emergence of a normative rhetoric: Personnel management Figure 4	1950 Emergence of a rational rhetoric: Systems rationalism Figure 5	1970 Emergence of a normative rhetoric: Culture-quality Figure 5

FIGURE 4
Normative-Rational Substitution

(a) Scientific Management Articles

(b) Human Relations/Personnel Management Articles
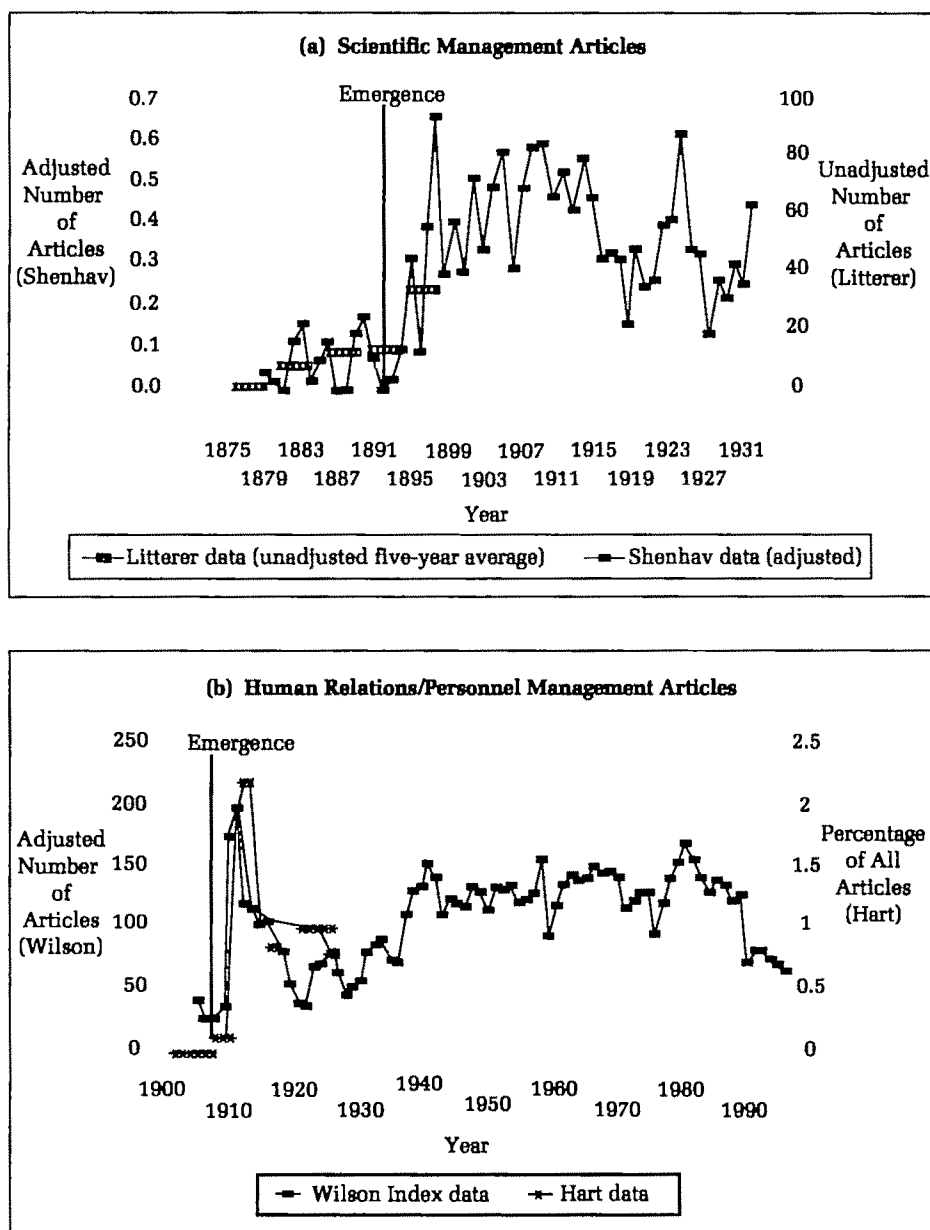
Was the emergence of the scientific management rational rhetoric during the early 1890s followed by the emergence of a new normative rhetoric? The Hart data in the bottom graph of Figure 4 reveal that virtually no articles on human relations/personnel management were published between 1905

FIGURE 5
Rational-Normative Substitution

(a) Systems Rationalism Articles

(b) Culture-Quality Articles
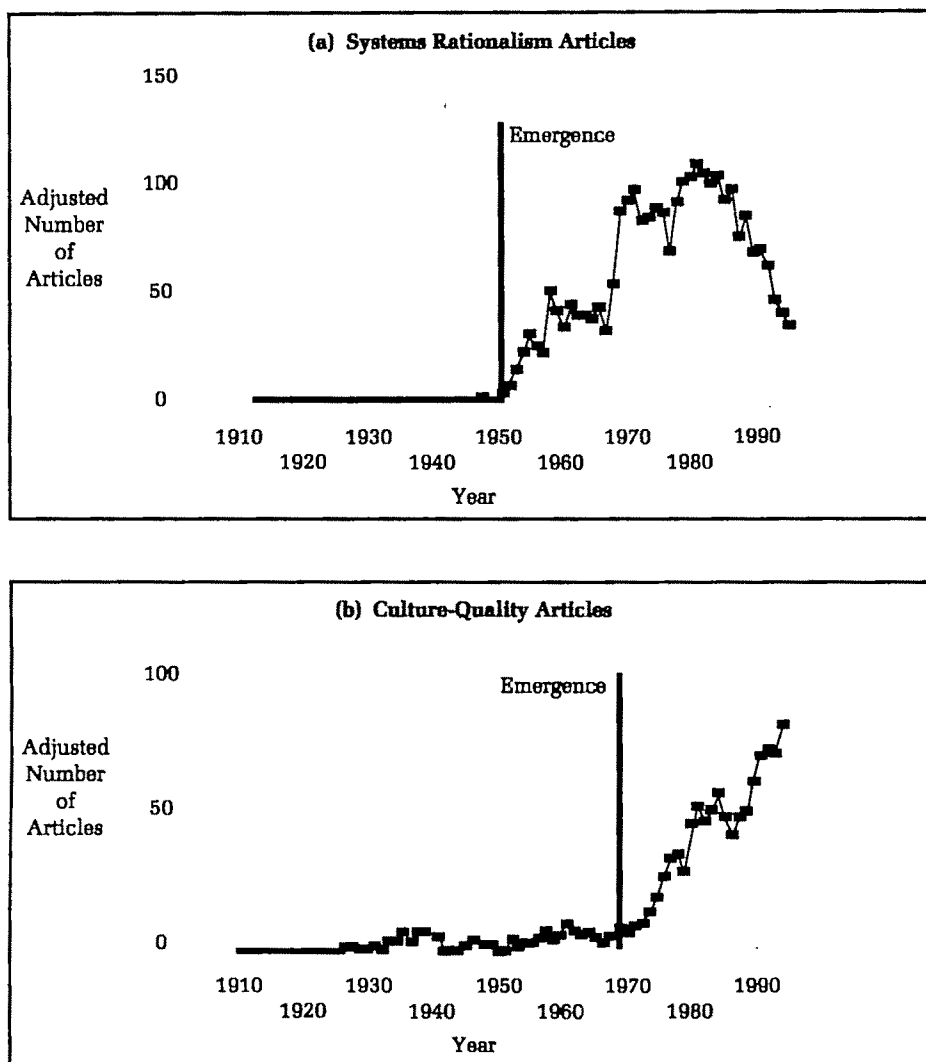
and 1914. However, both the Hart and Wilson bibliometric data reveal the emergence of this normative rhetoric during the World War I period. Figure 3 reveals the resurgence of the welfare work rhetoric during this period as well.

The emergence of the normative human relations/personnel management rhetoric during the World War I period (bottom graph, Figure 4) was followed during the 1950s by the emergence of a new rational rhetoric: systems rationalism (top graph, Figure 5). The emergence of this rational

rhetoric was followed in turn by the emergence of a new normative rhetoric, culture-quality, during the 1970s (bottom graph, Figure 5).

In sum, Table 3 indicates, in support of Hypothesis 1, that new normative and rational rhetorics emerge in different periods. The results also indicate, in support of Hypothesis 2, that new normative and rational rhetorics emerge in alternation.

Timing. The pendulum thesis suggests that 50-year-long macroeconomic waves explain the timing of the emergence of rational and normative rhetorics. Since scholars' estimates of long waves' timing differ slightly, Barley and Kunda (1992) averaged the various sources (Kondratieff, 1935; Mandel, 1980; Rostow, 1978; Schumpeter, 1935; Sterman, 1990; VanDuijn, 1983). Two long waves overlap with this study's time frame: the third Kondratieff long wave (1894–1921 upswing and 1921–44 downswing) and the fourth Kondratieff long wave (a 1944–71 upswing and a downswing between 1971 and the present). Table 3 indicates that the surge in the scientific management rhetoric occurred toward the end of the downswing in the second Kondratieff long wave, in accordance with Hypothesis 3. The Shenhav (1995) data (top graph of Figure 4), in particular, reveal a sharp, lasting increase in the scientific management rhetoric beginning in the early 1890s. The systems rationalism evidence, however, is less supportive of Hypothesis 3. Systems rationalism articles surged in 1950, slightly after the end of the third Kondratieff long wave. Table 3 also indicates that the emergence of both normative rhetorics (Figures 4 and 5, bottom halves) tended to precede the onset of long wave downswings, in full support of Hypothesis 4.

The Postemergence Prevalence of Employee Management Rhetorics

As was noted above, the pendulum thesis explains the emergence of management rhetorics, but not necessarily their postemergence prevalence. In particular, the pendulum thesis does not clarify (1) whether rhetorics that emerge around the onset of a particular stage of a long wave (an upswing or a downswing) remain prevalent throughout the stage and (2) whether rhetorics persist when the stage has ended. With respect to the first question, this article's bibliometric data indicate that, though the onset of macroeconomic upswings coincides with the emergence of new rational rhetorics, these rhetorics do not always remain prevalent throughout upswings. Figure 6, for example, reveals a sharp decline in a rational rhetoric, scientific management, occurring as early as 1913—the midpoint of a long wave upswing. Likewise, though the emergence of normative rhetorics tends to coincide with the onset of macroeconomic contractions, the bibliometric data indicate that these rhetorics did not always remain prevalent throughout these contractionary periods. Figure 4 reveals that the prevalence of two normative rhetorics, welfare work and human relations/personnel management, declined during the 1920s, the early part of a period of macroeconomic contraction. In sum, it seems that the postemergence prevalence of employee management rhetorics is not tied to long waves.

With respect to the second question—whether rhetorics outlive the long

FIGURE 6
Postemergence Decline in the Prevalence of a Rational Rhetoric:
Scientific Management Articles
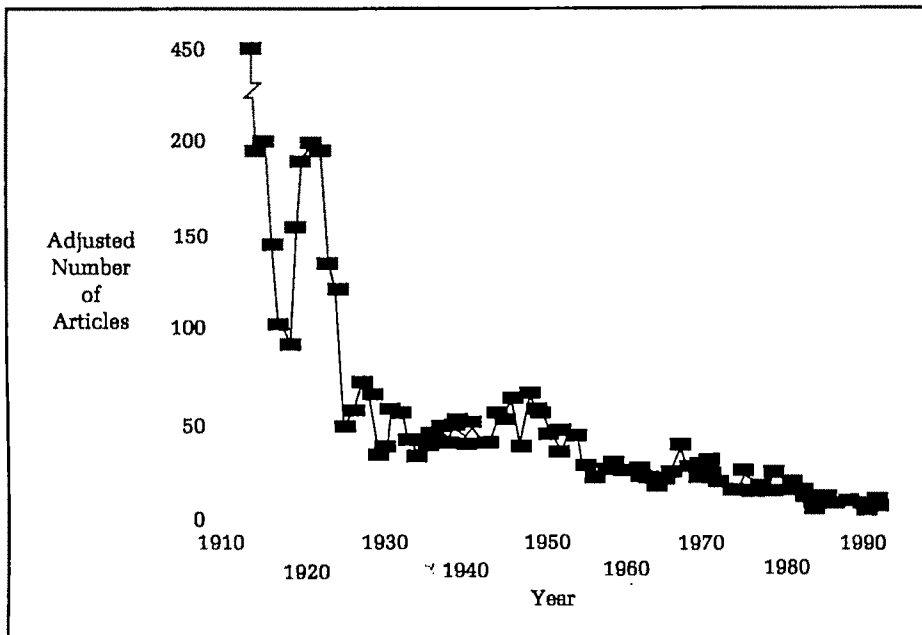
wave stage that triggered their emergence—the data indicate that of the four rhetorics in this study emerging around the onset of a particular long wave stage that has since ended, all four survived the end of that stage. Some of these rhetorics even resurged in later stages. Figure 3, for example, reveals that the welfare work rhetoric, which emerged before the turn of the century (Brandes, 1970), experienced a resurgence of popularity around the time of World War I and in the 1970s as well. I examine next what explains rhetorics' postemergence prevalence.

Voluntary turnover and labor union activity. Table 4 presents the correlation table for the independent and dependent variables. The table does not reveal high levels of multicollinearity. I calculated the GLS regression equations reported in Table 5 to examine the effect of various forces on rhetorics' postemergence prevalence.[12]

Models 1 through 8 reveal no statistically significant influences for the control variables across all rhetorics. The results in columns 1 and 8 reveal that the number of welfare work articles is positively and significantly cor-

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[12] As was noted above, estimates of strike data involving more than six employees were used between 1982 and 1992. The reported results use these data. However, I also tested the models omitting data from 1982 to 1992. The results did not differ substantially. I also found no significant lagged effects of the independent variables.

TABLE 4
Descriptive Statistics and Correlations[a]

	Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9
1.	Scientific management	52.99	63.45									
2.	Welfare work	128.50	68.89	.22								
3.	Human relations	103.45	39.14	-.17	.30**							
4.	Systems rationalism	104.52	79.71	.07	.21	.48***						
5.	World wars			-.13	.21	.00						
6.	Wagner Act			-.02	-.10	-.02		.31**				
7.	Civil Rights Act			-.13	-.04	.14	.04	-.05	-.02			
8.	Voluntary turnover	2.44	1.55	-.05	.32**	.01	.04	.20	-.11	.01		
9.	Percentage in labor unions	23.50	9.00	-.24*	.19	.29**	.02	.05	-.09	.12	-.06	
10.	Strikes	3,421.54	1,453.18	.03	.04	.16	.25	.14	-.15	.17	.22	.01

[a] $N = 79$, except systems rationalism, where $N = 45$.
* $p < .05$
** $p < .01$
*** $p < .001$

TABLE 5
Interated Yule-Walker GLS Regression of the Adjusted Number of Articles[a]

Variable	Model 1: Welfare Work	Model 2: Welfare Work	Model 3: Human Relations/ Personnel Management	Model 4: Human Relations/ Personnel Management	Model 5: Scientific Management	Model 6: Scientific Management	Model 7: Systems Rationalism	Model 8: Systems Rationalism
Constant	98.63*	119.85***	114.86***	83.91***	32.83	52.39*	170.27	34.26
	(44.75)	(26.24)	(26.91)	(13.78)	(28.10)	(18.84)	(31.99)	(22.40)
World wars	-17.25	-15.61	5.64	0.89	-2.17	-2.03		
	(27.16)	(27.31)	(17.08)	(16.22)	(12.69)	(12.97)		
Wagner Act	-24.19	-25.39	-3.92	-4.97	-1.01	-1.76		
	(26.60)	(26.73)	(16.67)	(15.57)	(12.59)	(12.87)		
Civil Rights Act	-19.85	-20.20	12.80	6.42	-5.12	-5.16	14.22	-2.63
	(22.23)	(22.77)	(13.82)	(13.07)	(10.82)	(11.18)	(8.21)	(9.00)
Voluntary turnover	9.83**	10.33**	0.12	-0.42	-0.51	-0.77	-3.52	-4.63
	(3.62)	(3.74)	(2.29)	(2.30)	(1.65)	(1.73)	(4.05)	(4.37)
Degree of unionization	0.84		-0.12		1.01		-4.02***	
	(1.59)		(0.96)		(0.89)		(1.05)	
Strikes		-0.00		0.00		0.00		0.00
		(0.00)		(.00)		(0.00)		(0.00)
R^2	0.13	0.14	0.02	.13	.03	0.07	0.34	0.09
Durbin-Watson[d]	1.52	1.54	2.02	1.89	1.06	1.02	1.86	1.63

[a] $N = 79$, except for systems rationalism, where $N = 45$. Standard errors are in parentheses.
  * $p < .05$
  ** $p < .01$
  *** $p < .001$

related to the voluntary turnover rate, in support of Hypothesis 5, but not to the frequency of strikes or the degree of unionization, contrary to Hypothesis 7. Results in columns 3 and 4 indicate that the number of human relations/personnel management articles, on the contrary, is not significantly correlated to the voluntary turnover rate, contrary to Hypothesis 5. It is, however, significantly and positively correlated to the frequency of strikes, though not to the degree of unionization, providing partial support for Hypothesis 7. Columns 5 and 6 indicate that neither turnover rate, strike frequency, nor unionization degree were significantly correlated to the scientific management series. These results are consistent with Hypotheses 6 and 8. Columns 7 and 8 indicate that neither turnover rate nor strike frequency was significantly correlated to the systems rationalism series, consistent with Hypotheses 6 and 8. Contrary to Hypothesis 8, however, the degree of unionization was strongly and negatively correlated to the systems rationalism series. Durbin-Watson's *d*, which fell in the acceptable range for all other series, did not fall in the acceptable range for the scientific management series.[13]

I present five-year moving averages of the data in Figure 7 to make the statistically significant relations noted in Table 5 readily apparent. The top of Figure 7 reveals that the number of welfare work articles is related to the voluntary turnover rate, whereas the bottom of Figure 7 suggests that the number of human relations/personnel management articles is related to the frequency of strikes and the percentage of employees in labor unions. However, both the top and bottom of Figure 7 reveal a finding that was not hypothesized: these relations appear much more pronounced in the earlier than in the later part of the series. The number of welfare work articles tracks the voluntary turnover rate closely until the mid-1950s, at which point it lags well behind it. Likewise, the tight relation between the number of human relations/personnel management articles, strikes, and unionization also appears to have ceased in the mid-1950s. I computed models for the earlier and later parts of the series separately. The dividing line between the earlier and later periods was set at 1955, because it is generally accepted as the beginning of a long downward trend in the degree of unionization in the United States (Freeman & Medoff, 1984). Table 6 presents regression results for earlier and later parts of the series.

Hypothesis 5 suggests that the welfare work series will correlate significantly with the voluntary turnover rate series. The results support Hypothesis 5 between 1913 and 1954 (models 1 and 2) but not between 1955 and 1992 (models 3 and 4). Similarly, Hypothesis 5 suggests that the human relations/personnel management series would correlate significantly with

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[13] An autoregressive, integrated, moving average technique (ARIMA) revealed that the scientific management time series had three significant autoregressive components (Box & Jenkins, 1976). To deal with this pattern of serial correlation, I used a Granger causality test (Granger, 1969) to examine the impact of the independent variables on the scientific management series. This method revealed no significant effects of the independent variable on the scientific management dependent variable. Results are available upon request.

FIGURE 7
The Effects of Labor Union Activity and Voluntary Turnover

(a) Turnover and Welfare Work Articles

(b) Strikes, Percentage of Unionization, and Human Relations/Personnel Management Articles
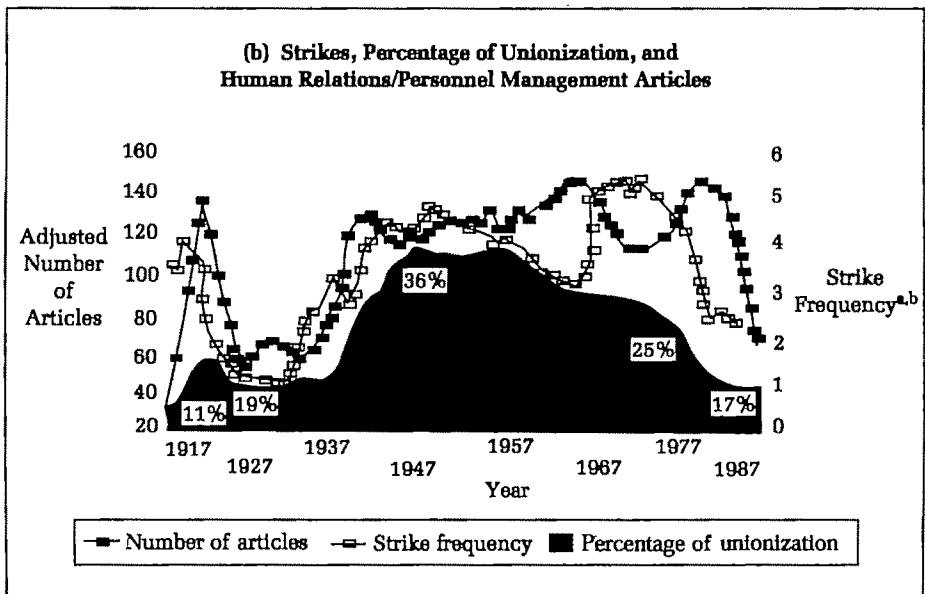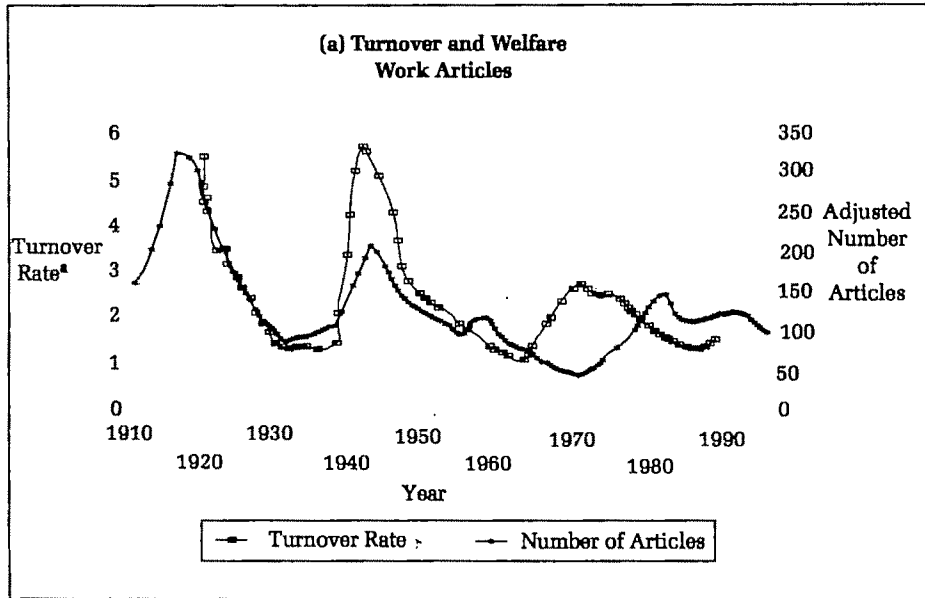
[a] Five-year moving average.
[b] In thousands.

TABLE 6
Iterated Yule-Walker GLS Regression of the Adjusted Number of Welfare Work, and Human Relations/Personnel Management Articles for Early and Late Periods[a]

Variable	Model 1: Welfare Work 1913–54	Model 2: Welfare Work 1913–54	Model 3: Welfare Work 1955–92	Model 4: Welfare Work 1955–92	Model 5: Human Relations/ Personnel Management 1913–54	Model 6: Human Relations/ Personnel Management 1913–54	Model 7: Human Relations/ Personnel Management 1955–92	Model 8: Human Relations/ Personnel Management 1955–92
Constant	125.65*	133.88***	150.73*	73.67*	27.83	37.16**	139.76***	120.84***
	(51.12)	(35.71)	(65.40)	(33.70)	(14.96)	(11.57)	(30.02)	(19.35)
World wars	–27.03	–26.33			5.11	4.87		
	(34.88)	(34.70)			(15.97)	(14.60)		
Wagner Act	–34.06	–34.08			5.36	–1.97		
	(34.56)	(33.54)			(14.20)	(13.46)		
Civil Rights Act			–3.82	–8.84			15.36†	16.90†
			(14.37)	(14.49)			(9.20)	(10.31)
Voluntary turnover	12.38*	12.30*	–5.65	–11.01	7.99**	5.48†	5.47	10.16
	(4.94)	(5.05)	(10.67)	(11.14)	(2.88)	(2.78)	(8.47)	(9.98)
Degree of unionization	0.47		–1.56		1.66***		–1.02	
	(1.88)		(2.18)		(0.56)		(0.92)	
Strikes	0.00	0.00		0.01		0.01***		–0.00
	(0.00)	(0.00)		(0.00)		(0.00)		(0.01)
R^2	0.22	0.22	0.03	0.09	0.49	0.56	0.14	0.13
Durbin-Watson[d]	1.45	1.47	1.87	1.89	1.60	1.88	1.92	1.95

[a] $N = 41$ for the early period and $N = 38$ for the later period. Standard errors are in parentheses.

† $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

the voluntary turnover rate series, and Hypothesis 7 implies that it would correlate significantly with both the degree of unionization and strike frequency series. Again, results support these hypotheses for the 1913–54 period (models 5 and 6), explaining over 50 percent of the variance, but results do not support predictions for the 1955–92 period (models 7 and 8). Interestingly, the results in models 7 and 8 indicate that the Civil Rights Act had a statistically significant effect in the 1955–92 part of the series ($p < .10$). I discuss this final result in the next section.

DISCUSSION

In this study, I examined 117 years (1875–1992) of bibliometric data in order to evaluate two theories explaining the emergence and prevalence of various employee management rhetorics. The first, the pendulum theory, suggests that the emergence of new employee management rhetorics will coincide with turning points in long waves of historical activity. The second, the performance-gap theory, suggests that varied forces influence these rhetorics' postemergence prevalence. Some support was found for theories explaining both rhetorics' emergence and postemergence prevalence. Moreover, the two theories were found to complement each other.

The Pendulum Theory of Emergence

The results indicate that new rational rhetorics tend to emerge toward the ends of long wave downswings, whereas new normative rhetorics tend to emerge toward the ends of their upswings. This pattern resembles that seen in Figure 1 for nonmanagerial innovations. These innovations are usually found clustered around the turning points at the troughs of long waves (Freeman et al., 1982; Kleinknecht, 1987, 1990; Mensch, 1979). According to Neo-Schumpeterian scholars, this dynamic occurs because clusters of both managerial and nonmanagerial innovations interrupt downswings in long waves and cause the macroeconomic expansions that impel upswings in the wave (Tylecote, 1992, 1994). This clustering dynamic would explain why I found surges in rational rhetorics shortly before (scientific management) and after (systems rationalism) the troughs of long waves. It would also explain why I found surges in normative rhetorics (human relations/personnel management and culture-quality) antedating the turning points at the peaks of long waves. As a long wave upswing loses momentum, managers become receptive to normative rhetorics as they try to avert the economic slowdown that precedes the long wave downswing.

Barley and Kunda concluded from their results that "changes in the tenor of managerial discourse [rhetorics] generally lagged the beginning of an upturn or a downturn [in a long wave], thereby raising the possibility that the latter may have cued the former" (1992: 391). In other words, "techno-economic" forces trigger rhetorics' emergence and, consequently, these rhetorics are epiphenomena. This study's results suggest a more complex

and consequential picture. The emergence of rhetorics not only reflects tech-noeconomic forces, but also may play a role in shaping them.

Such a proposition clarifies recent transformations in employee man-agement rhetorics. Indeed, this study's results indicate that the rational rhetoric of scientific management arose around the time the second Kon-dratieff long wave reached its trough, whereas the systems rationalism ra-tional rhetoric arose around the time the third Kondratieff long wave reached its trough. If the long wave thesis is correct, the trough of the fourth Kon-dratieff long wave is now near. The pendulum thesis suggests that observers should be witnessing the emergence of a new rational rhetoric.

It is possible to see very preliminary signs of the emergence of a new rational rhetoric, which I call "flexible rationalism." This rhetoric advocates that corporations and government agencies use techniques such as down-sizing and reengineering to formalize, rationalize, and optimize work pro-cesses. The rhetoric takes its name, flexible rationalism, from the fact that it advocates flexibility both in employee-employer relations and in manage-ment processes, with the goal of adapting organizations to rapidly changing environments. It is too early, however, to declare with any certainty that flexible rationalism has emerged or that it constitutes a unified rhetoric. Such a judgment must await the passage of time.

The Performance Gap Theory of Postemergence Prevalence

The study indicated that rhetorics do not always retain their prevalence throughout the periods that marked their emergence, though they sometimes do persist and even resurge in later periods. This study suggests, therefore, that a different type of explanation is needed to complement the long wave theory of management rhetorics. Such an explanation must account for the postemergence prevalence of both normative and rational employee man-agement rhetorics.

Normative rhetorics. With respect to normative rhetorics, this study found support for explanations that attribute their postemergence preva-lence, in different periods, either to labor union activity, or the rate of vol-untary turnover among employees, or government interventions. More spe-cifically, the study's results are noteworthy because they are remarkably consistent with the historical accounts bearing on the human relations/personnel management rhetoric (Kochan & Cappelli, 1984; Kochan et al., 1994). Put very succinctly, these accounts suggest that the prevalence of the human relations/personnel management rhetoric fluctuated with labor union activity until the mid-1950s. Likewise, the study's results indicated that both labor union activity—whether measured using strike frequency or degree of unionization—and voluntary turnover correlated with the number of human relations/personnel management articles published in the United States.

Beginning in the mid 1950s, the degree of U.S. unionization declined steadily, and so should have the prevalence of the human relations/personnel management rhetoric. Kochan and colleagues argued that it did

not, however, because of government intervention through the 1960s and 1970s, exemplified by Title VII of the Civil Rights Act of 1964. The primary responsibility for meeting government requirements fell to a growing and newly empowered cadre of personnel management professionals who embraced the human relations/personnel management employee management rhetoric. Consistent with this account, the study's results indicated that, beginning in the mid 1950s, variables measuring labor union activity no longer had a statistically significant effect on the prevalence of the human relations/personnel management rhetoric, but that the variable representing the vigor of enforcement of the Civil Rights Act did.

The results also indicated that the welfare work rhetoric fluctuated with the voluntary turnover rate for the full period of the study (1913 through 1992), but not with labor union activity. This null finding may have occurred because a large part of the welfare work rhetoric focuses on keeping individuals and small groups satisfied, committed, and attached to their organization, and not so much on forestalling unionization (Brandes, 1970). This focus would explain why I did not find that the welfare work rhetoric's prevalence was tied to labor union activity, but rather, that its prevalence increased when managers would have felt pressure to keep employees happy and thus attached to their employers.

Rational rhetorics. The bibliometric data suggest that after some initial fluctuations ending in the mid-1920s, the prevalence of the scientific management rhetoric remained constant over the next 30 years. The decline in its prevalence seems to have occurred only when the systems rationalism rhetoric replaced it during the late 1950s and early 1960s. Likewise, the recent decline in the prevalence of systems rationalism coincides with the emergence of what may be a new rhetoric, flexible rationalism.

The findings of this study and of Shenhav (1995) indicate that the postemergence prevalence of rational rhetorics fluctuates in response to particular environmental forces. Shenhav argued that the systematic management rhetoric (which I call scientific management) promised to counter labor union activity. He hypothesized and found that its prevalence was positively related to the degree of labor union activity between 1979 and 1932. I hypothesised and found that this result would not hold up over the period covered in the present study (1913–92), because scientific management's promise of labor peace was clearly discredited over most of this period (Barley & Kunda, 1992; Edwards, 1979). My results also indicated that the postemergence prevalence of the systems rationalism rhetoric was strongly and negatively influenced by the degree of unionization after World War II. These results may have occurred because rhetorics advocating the imposition of rational controls over employees could only become popular in the face of feeble opposition by weakened labor unions.

In sum, this article makes a number of contributions that move research on the prevalence of employee management rhetorics well beyond where Barley and Kunda (1992) left it. First, and most important, the study indicates that the performance gap and pendulum theses are complementary,

rather than contradictory, as Barley and Kunda (1992) asserted. The pendulum thesis explains the emergence of new rhetorics, whereas the performance-gap thesis helps explain their postemergence prevalence. Second, with respect to the pendulum thesis, this study's results suggest that the emergence of rhetorics may be a cause of long-term macroeconomic trends, and not just a consequence of those trends, as Barley and Kunda suggested. Third, this study, unlike their study, explains current developments in employee management rhetorics. In particular, it explains the recent emergence of discourse promoting management techniques, such as reengineering, that have a markedly rational flavor. Fourth, this study indicates that Barley and Kunda may have been wrong in squarely rejecting the performance-gap thesis. This study's quantitative analysis of carefully validated bibliometric data indicate that the postemergence prevalence of both normative and rational rhetorics can be influenced by environmental changes, such as the degree of labor union activity.

CONCLUSION

It is difficult not to be struck by the many, often sudden, changes that occur in what is written in the United States about how to manage organizations and their employees. The recent past has seen transient waves in the amounts written about particular management techniques—T-groups, quality circles, just-in-time inventory management, total quality management, and business process reengineering, to name a few (Abrahamson & Fairchild, 1996). And this article reveals that the past has also seen the sudden emergence and irregular postemergence prevalence of entire rhetorics promoting multiple management techniques.

Such changes in employee management rhetorics matter greatly for management theorists, researchers, and practitioners. On the practical side, a number of critiques in the popular and academic press have contained the assertion that swings in popular business writing occur quasi-randomly and shape managerial behavior in ways that harm large numbers of managers, organizations, and their employees (*Business Week*, 1986; Eccles & Nohria, 1992; Nohria & Berkley, 1994; *Economist*, 1990; *Wall Street Journal*, 1993). A passage from Nohria and Berkley's *Harvard Business Review* article provides the flavor:

> The 1980's witnessed the spectacular rise of management schools, consultants, media and gurus who fed on the insecurity of American managers fearful of foreign competition and economic decline. Mistrustful of their own judgement, many managers latched on to these self appointed pundits, readily adopting their last panaceas. Off-the-shelf programs addressing quality, customer satisfaction, competitiveness, organizational culture, and empowerment swept through U.S. corporations with alarming speed. . . . For some businesses, the new ideas worked. . . . But in the majority of cases, research shows, the

> management fads of the last 15 years rarely produced the prom-
> ised results.
>
> (Nohria & Berkley, 1994: 128).

Either such critiques are correct, and the production of management rheto-
rics and techniques in the United States should be reformed, or they are
incorrect, and the entire field of management is being unjustly vilified (Abra-
hamson, 1991). Either way, employee management rhetorics may have im-
portant implications for managers, employees, and management scholars as
well. An understanding of forces influencing rhetorics' emergence, preva-
lence, and consequences is an important objective for research.

Such research is challenging for a number of reasons. First, it must
explain the causes of rhetorical changes over periods spanning decades and
sometimes centuries. Second, it must do so in the face of a welter of con-
flicting theories (Abrahamson, 1996), including theories that suggest that a
variety of sociopsychological forces cause waves of discourse promoting
particular management techniques to emerge and evolve quasi-randomly,
and theories—such as the pendulum and performance-gap theories tested in
this article—that suggest that employee management rhetorics evolve in re-
sponse to macroeconomic and macropolitical changes. This research is also
difficult because there is a dearth of relevant, carefully validated, reliable
data.

Given these difficulties and the early stage of research in this area, the
result of any single study must be seen as highly tentative. Other analyses of
my data are possible and necessary. Other interpretations could and should
be drawn from them. Indeed, one purpose of this article was to encourage
thinking and research about the evolution of management rhetorics.

I hope, therefore, that this article will have suggested a number of im-
portant issues worthy of further consideration. In order to study the emer-
gence and prevalence of five broad employee-management rhetorics over
117 years, it was necessary to aggregate multiple series of counts of articles
bearing on varied employee management techniques. This broad, longitudi-
nal approach may have introduced aggregation biases (Hannan, 1971). Con-
sequently, analyses that disaggregate these series need to be undertaken.
Such analyses would make it possible to examine the evolution of rhetorics
and not just their emergence and postemergence prevalence. Jacoby (1985:
195–205), for example, argued that in the mid-1920s writers began advocat-
ing the use of welfare work techniques that had financial incentives, such as
profit sharing and employee stock ownership. Such a claim could be tested
by examining whether the general decline in the welfare work rhetoric in the
1920s extended to this new welfare work rhetoric.

Moreover, in order to carry out a broad analysis over an extended time
period, it was necessary to use fairly coarse measures of rhetorics' emergence
and prevalence. This study, however, highlights specific events during
which finer-grained analyses might prove productive. The titles of articles in
the Wilson index could be analyzed to this end. For more recent time peri-
ods, on-line databases provide abstracts of articles and, on occasion, their

full texts. Content analyses of these texts would provide even richer measures of rhetorics' emergence, prevalence, and evolution (Abrahamson & Fairchild, 1996; Barley et al., 1988).

With respect to theory, this article suggests that the pendulum and performance-gap theses complement rather than contradict each other. More generally, this article supports theories suggesting that employee management rhetorics evolve in relation to macroeconomic and macropolitical changes. This observation raises the question, How does this coupling occur? How do purveyors of rhetorics sense macroeconomic, macropolitical, and other environmental changes and articulate responses to these changes for managerial audiences? The type of data developed in this study make it possible to begin studying how, when, and why a variety of management knowledge producers—policy makers, managers, consultants, reformers, academics, and journalists—have interacted historically to shape organization management and employee management ideologies and rhetorics (Abrahamson, 1996).

This study also raises important questions about the impact of management rhetorics. It suggests that new managerial rhetorics not only reflect technoeconomic forces, but may also shape them. It suggests that clusters of innovations that cause sustained macroeconomic growth contain not only technological innovations, but also the managerial innovations needed to rationalize production processes so that these technological innovations can be exploited. New management rhetorics may, therefore, constitute necessary conditions for long-term macroeconomic upswings. Relatedly, this study suggests a tantalizing possibility—the emergence of a new rational rhetoric, flexible rationalism, comprising techniques such as downsizing, reengineering, just-in-time employee management, and portfolio careers, to name a few. Such a rhetoric could play a role in disseminating the management techniques necessary to fully exploit computers, software, and other technical innovations capable of raising labor productivity in business and government.

Clearly, these concluding comments are speculative. They are, however, congruent with my general goal throughout this article, which was not to provide a definitive analysis, but rather to stimulate thought and further consideration of the issues covered in this article. Are there rhetorics that promote related sets of techniques for managing organizations and their employees? Why do new rhetorics emerge? Why do they emerge when they do? What explains their postemergence prevalence? And what is the impact of rhetorics' emergence and prevalence?

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A RESOURCE-BASED PERSPECTIVE ON CORPORATE ENVIRONMENTAL PERFORMANCE AND PROFITABILITY

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Drawing on the resource-based view of the firm, we posited that environmental performance and economic performance are positively linked and that industry growth moderates the relationship, with the returns to environmental performance higher in high-growth industries. We tested these hypotheses with an analysis of 243 firms over two years, using independently developed environmental ratings. Results indicate that "it pays to be green" and that this relationship strengthens with industry growth. We conclude by highlighting the study's academic and managerial implications, making special reference to the social issues in management literature.

Although the basic tenet of corporate social responsibility is that society and business are tightly interwoven (Wood, 1991), scholars are still struggling to specify the precise mechanisms linking firms and society. Within this conversation, a central issue has been the economic impact on a firm of its social policies. In this article, we focus on the economic impacts of environmental performance, a specific social issue that has provoked a very public debate. On the one hand, it has been forcefully argued that environmental regulation enhances economic performance in an efficiency-producing, innovation-stimulating symbiotic relationship (Gore, 1993; Porter, 1991). On the other hand, regulations are assailed as generating costs that businesses will never recover, representing financial diversions from vital productive investments (Gingrich, 1995; Walley & Whitehead, 1994).

A number of empirical studies performed in this area have returned differing verdicts. Several studies have shown no significant link between measures of environmental performance and profitability (Fogler & Nutt, 1975; Rockness, Schlachter, & Rockness, 1986) or between environmental performance and corporate disclosure practices (Freedman & Jaggi, 1982;

Wiseman, 1982). But other studies have shown that better pollution perfor-
mance improved profitability (Bragdon & Marlin, 1972; Spicer, 1978a) and
reduced risks (Spicer, 1978b) and that federal compliance liability costs and
profitability were negatively related (Holman, New, & Singer, 1985). One can
challenge these prior studies on methodological grounds. All but one used
small, single-industry samples. More importantly, they have frequently re-
lied on self-reported data, failed to control for other predictors of profitabil-
ity, and used questionable social responsibility measures (Wood & Jones,
1995). These methodological shortcomings may be responsible for results to
date that have shown an equivocal relationship between environmental per-
formance and economic performance.[1]

Wood and Jones (1995) argued that this inconclusiveness is primarily
due to a key conceptual shortcoming, failure to carefully trace how the social
policies examined directly influence firms' bottom lines. For example, we
would expect that any external imposition of fines or additional compliance
costs would drive down profits, thus accounting for the significant effects of
these costs found in several of the studies just cited. We agree with Wood
and Jones that there are conceptual flaws in prior research, but we also
suggest that the relationship is more complex than a simple calculus equat-
ing higher costs with lower profits. After all, if the sole driving force for a
corporate environmental policy is minimizing tangible pollution costs, then
any firm going beyond compliance would forfeit the profits it could gain
from simply (and legally) continuing to externalize those costs. Our argu-
ment, based on the resource-based view of the firm, highlights the role en-
vironmental policy plays in generating broader organizational advantages
that allow a firm to capture premium profits. In a sense, it could be said that
the same policies that internalize negative environmental spillovers can pay
off by simultaneously generating greater positive organizational spillovers
that accrue internally and privately to the firm. Thus, for both methodologi-
cal and conceptual reasons, a careful study of the relationship between en-
vironmental performance and economic performance is both timely and
potentially of great value.

The resource-based view of the firm offers corporate social responsibil-
ity researchers a tool for refining the analysis of how corporate social policy
influences the bottom line for two reasons. First, the resource-based view has
a strong focus on performance as the key outcome variable. And second, like
the social responsibility literature, work adopting the resource-based view
explicitly recognizes the importance of intangible concepts, such as know-
how (Teece, 1980), corporate culture (Barney, 1986), and reputation (Hall,
1992). These theoretical complementarities offer a significant opportunity

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[1] Two working papers (Hart & Ahuja, 1994; Cohen, Fenn, & Naimon, 1995) have also
addressed the environment-performance relationship, with mixed results. The equivocality of
results in this area extends to other social issues, such as corporate philanthropy and commu-
nity relations. Ullman (1985), Aupperle, Carroll, and Hatfield (1985), and most recently, Wood
and Jones (1995) have offered surveys of empirical work in this area.

that we hoped to exploit in this study, which spotlights the environmental performance—economic performance relationship. Further, we explored industry growth as a moderator of this relationship, theorizing that firms are less likely to reap benefits from increased environmental performance when industry growth is low. But before formally stating these predictions, we briefly outline the resource-based theory of competitive advantage.

A RESOURCE-BASED VIEW OF ENVIRONMENTAL PERFORMANCE AND ECONOMIC PERFORMANCE

The Resource-Based View of Competitive Advantage

The resource-based view of the firm grew out of a frustration with the structure-conduct-performance paradigm of the industrial organization (IO) view of the firm (Bain, 1959; Porter, 1980). The early resource-based theorists found the IO view—that a firm's success was wholly determined by its external environment—to be unrealistically limited and turned to the seminal work of Penrose (1959) for motivation. To counter the IO view, Wernerfelt (1984), Dierickx and Cool (1989), and Prahalad and Hamel (1990) built resource-based theory around the internal competencies of firms. In these contributions to resource-based theory, competitive advantage is rooted inside a firm, in assets that are valuable and inimitable. A firm's capabilities or competencies and management's abilities to marshal these assets to produce superior performance determine competitive advantage (Grant, 1991). In the drive to add depth and breadth to this internal view, theorists have noted but left somewhat vague the role of a firm's links to its external environment.

Barney's (1986) work addressed this issue by pinpointing the conditions under which a firm's resources become valuable by bringing the external environment into the resource-based picture. In developing the notion of external factor markets, he noted that, contrary to the IO model, external resource analysis alone cannot lead to valuable resources. However, by nurturing internal competencies and applying them to an appropriate external environment, a firm can develop a viable strategy. Thus, for a firm's resource to become valuable, it must allow the firm to "exploit opportunities or neutralize threats" in the firm's environment (Barney, 1991: 106). The link in resource-based theory between the competitive environment and firm capabilities was made more explicit by Conner (1991), in her comparison of the resource-based view and the IO and Chicago models. She observed that all three recognize the external constraints of demand conditions and public policy on strategy. For Conner, the task for resource-based theorists is to discern the appropriate rent-generating inputs given both external (e.g., demand, public policy, and competitor action) and internal (e.g., past history, resource endowments, and corporate culture) constraints.

Thus, in its current state, the resource-based view addresses the fit between what a firm has the ability to do and what it has the opportunity to do. To quote Collis and Montgomery, "Resources cannot be evaluated in isolation, because their value is determined in the interplay with market forces.

A resource that is valuable in a particular industry or at a particular time might fail to have the same value in a different industry or chronological context" (1995: 120).

In the resource-based view, resources are classified as tangible, intangible, and personnel-based (Grant, 1991). Tangible resources include financial reserves and physical resources such as plant, equipment, and stocks of raw materials. Intangible resources include reputation, technology, and human resources; the latter include culture, the training and expertise of employees, and their commitment and loyalty. As these resources are not productive on their own, the analysis also needs to consider a firm's organizational capabilities—its abilities to assemble, integrate, and manage these bundles of resources. In our application of the resource-based view, we considered resources and capabilities in the following combinations: (1) physical assets and the technologies and skills required to use them, (2) human resources and organizational capabilities, which include culture, commitment, and capabilities for integration and communication, and (3) the intangible resources of reputation and political acumen.

Previous applications of resource-based theory to evaluation of environmental policies and strategy have concentrated on internal analysis of firms (Porter, 1991; Shrivastava, 1995a). However, Hart (1995) expanded the resource-based view of the firm to include the constraints imposed and opportunities offered by the biophysical environment. In his theory, he provided a schema that links the imperative of capturing a competitive advantage with the goal of securing and enhancing social legitimacy. He viewed external stakeholders as playing a pivotal role in moving corporations toward sustainability. The logical extension of this argument is that viewing societal demands as part of the external environment facing a firm trying to develop unique resources leads to expectations about when such resources will be valuable and inimitable. We suggest this is particularly true when society is demanding a cleaner environment.

In developing our theory, we found it useful to bear in mind two modes of environmental policy advanced by Hart (1995). The first is the compliance strategy, wherein firms rely on pollution abatement through a short-term, "end-of-pipe" approach, often resisting the enactment and enforcement of environmental legislation. Firms often fall short of compliance in this mode. The second mode of environmental policy is going beyond compliance to a focus on prevention, a systemic approach that emphasizes source reduction and process innovation (Hart, 1995). Our position is that firms that tend toward the compliance mode will differ in their resource bases from those that tend toward prevention and that this policy choice will affect firms' ability to generate profits.

Corporate Environmental Performance and Profitability

Physical assets and technology. The resources and capabilities required to implement a firm's environmental policy vary radically, depending on whether or not that firm goes beyond compliance to embrace pollution pre-

vention. End-of-pipe compliance policies affect only physical asset resources, which consist of the "physical technology used in a firm, a firm's plant and equipment, its geographic location, and its access to raw materials" (Barney, 1991). Compliance is achieved primarily by the addition of pollution-removing or filtering devices to the existing assets of a firm and does not require the firm to develop expertise or skills in managing new environmental technologies or processes. The technology is essentially self-contained, off-the-shelf hardware. Once such hardware is installed, it does not fundamentally vary production or service delivery processes. Thus, the implementation of this policy is straightforward and leaves a firm essentially in the same resource and capability situation it was in before it adopted the policy (Groenewegen & Vergragt, 1991; Kemp, 1993).

As a proactive environmental policy takes hold in a firm, we would expect it to redesign its production or service delivery processes. Such a redesign would likely involve the acquisition and installation of new technologies. Within this schema, the resource-based view of the firm provides a solid foundation for the hypothesis that improved environmental performance can enhance economic performance. Physical resources can be a source of competitive advantage if they "outperform" equivalent assets within competitors. The resource-based prediction would be that, if purchased from a third party, a physical asset itself cannot produce premium profits, as that technology is presumably available to competitors. However, if new physical assets are deployed in a way that allows a firm to capitalize on and enhance its internal methods for waste reduction and operational and fuel efficiency, such advantages are less transparent. And this method of deployment is likely to be the case within firms stressing prevention. Indeed, these internal routines represent the type of causally ambiguous resource (Reed & DeFillippi, 1990) that is central to the resource-based view of competitive advantage. When internal routines and know-how accumulate, a firm's knowledge of pollution prevention deepens (Dean & Brown, 1995). Such knowledge lessens the risk of spills and other actionable offenses taking place (Groenewegen & Vergragt, 1991; Shrivastava, 1995a).

Human resources and organizational capabilities. Embracing the notion of improved environmental performance also requires a fundamental shift in a firm's culture and human resources and the organizational capabilities required to manage them. Management, R&D, production, and marketing all must be involved and committed if a firm is to implement a policy of using clean technologies (Ashford, 1993; Hart, 1995). Use of clean technologies also adds complexity to production or delivery processes and requires increased skills from workers at all levels of the firm (Groenewegen & Vergragt, 1991). So prevention is a more comprehensive and socially complex process than compliance, necessitating significant employee involvement, cross-disciplinary coordination and integration, and a forward-thinking managerial style (Shrivastava, 1995b). For example, Hart (1995: 996) discussed Xerox's policy of viewing its leased copiers as a source of high-quality inputs for its new copiers. Such a policy ties together design

and manufacturing functions, along with those units responsible for interfaces with customers, resulting in company-wide gains. The process of developing a pollution prevention policy thus builds within a firm the resources of organizational commitment and learning, cross-functional integration, and increased employee skills and participation, which, we argue, are emerging as prime resources in the modern competitive environment.

A strong environmental stance can be expected to become part of an organization's image and identity and to guide the actions of its members (Dutton & Dukerich, 1991). Such a stance can be expected to influence human resource policies, in turn shaping job design, recruitment and selection, and training and development systems (Starik & Rands, 1995). In general, when a firm adopts a sophisticated human resource management strategy such as this, productivity improvements are captured (Koch & McGrath, 1995). One reason may be that attracting top candidates is easier for firms known for environmental stewardship. According to Dechant and Altman:

> Employees' views on a firm's environmental performance and whether it fits their values profile frequently affects their willingness to work for that firm. A 1991 McKinsey study of 403 senior executives from around the world revealed that sixty-eight percent of them agreed that "organizations with a poor environmental record will find it increasingly difficult to recruit and retain high caliber staff (McKinsey, 1991, cited in Gladwin, 1993)." This perspective was validated by Mike Joyce, Division Director of Environmental Affairs for Dexter Corporation, who indicated that "college graduates are looking for more than just a paycheck, they are looking for companies with which they can identify morally and philosophically" (1994: 8).

Intangible resources. Two intangible factors suggest that better environmental performance will augment profits. The first is that a reputation for leadership in environmental affairs will increase sales among customers who are sensitive to such issues. Indeed, such consumer actions appear to be increasingly frequent: although the phenomenon of consumers tying firms' social responsibility records to purchasing decisions is a relatively new one (Murray & Montanari, 1986), it is reported to be gaining steam (*Economist,* 1994).[2] The publication of popular handbooks, such as *The Green Consumer Supermarket Guide,* and the implementation of independent rating programs, such as Green Cross and Green Seal, have facilitated environmentally

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[2] Further evidence of the rise of green consumers abounds. Environmental awareness, after dipping in the mid-1980s, has again emerged as an issue globally and in America. A 1990 study by the Roper Organization found that from 1987 to 1990, public concern about the environment grew faster than concern about any other national problem. During this same period, the number of green product introductions quintupled to nearly 10 percent of all new products (Thayer, 1990), and the Sierra Club's membership rose an average of 13.9 percent annually (Sierra Club, 1993). Finally, nearly a third of consumers have purchased a product specifically for its green labeling or advertising, and a quarter routinely read labels to gain an understanding of the environmental impacts of products (Roper Organization, 1990).

informed buying behavior; these sources convey to consumers the informa-
tion they need to make choices among products and firms. Intermediate
purchasing behavior also reflects this trend: firms like McDonalds and Pru-
dential Insurance are pressuring upstream companies to "get greener" (Ho-
lusha, 1995).

As a firm develops an environmental policy, it must also develop a
reputation for that policy, since such a reputation is in itself a source of
market advantages. We observe such reputation-profit links in the business
world. Firms from ARCO to Procter & Gamble generally credit part of their
profits to a reputation for pro-environment corporate behavior (Harrison,
1993; Piasecki, 1995). An environmental reputation must be built on top of
an overall reputation for quality. Once gained, a pro-environment reputation
is itself a valuable inimitable resource. Haagen-Dazs cannot purchase Ben &
Jerry's reputation, nor can it effectively replicate that reputation in the short
term.

One intangible asset that has received little previous attention in re-
source-based theory development is an organization's political acumen,
which we define as the ability to influence public policies in ways that
confer a competitive advantage. This neglect of corporate political strategy
may be a result of managers viewing it as outside of their primary respon-
sibilities (Post, 1978). But savvy executives have firmly grasped the worth of
political strategy as a strategic resource (Mahon, 1989). Political skills are an
inimitable, valuable resource that can be used to neutralize, promote, or
otherwise manage external constituencies.

Managers following a compliance policy tend to employ legislative and
political lobbying aimed at slowing down the pace of environmental legis-
lation (Logsdon, 1985). This externally directed approach stands in contrast
to the technical and organizational focus of a prevention policy. Prevention-
oriented firms develop skills that help them adopt external technologies to
meet the demands of society and even move to "raise the floor" in that regard
(Starik & Rands, 1995: 923), but compliance-oriented firms develop political
acumen to fend off these imperatives. Such a reactive focus with respect to
other elements of firm strategy (e.g., product design or customer service)
would clearly be seen as inferior.

In summary, a resource-based analysis of the link between environmen-
tal performance and economic performance leads directly to our first hy-
pothesis:

> *Hypothesis 1. High levels of environmental performance
> will be associated with enhanced profitability.*

The Moderating Effect of Industry Growth

In this section, we discuss physical assets and technologies, human
resources and organizational capabilities, and intangible resources in turn,
arguing that industry context in general, and the growth within an industry
in particular, moderate the influence of social performance on economic

performance. As noted above, the majority of work in this area has stressed issues internal to firms. Here, we try to trace why firms are more likely to reap benefits from increased social performance when they are in high-growth industries rather than low-growth industries.

Physical assets and technology. Movement toward the prevention mode of operation increases a firm's level of risk. Under normal conditions, an investment in redesigning and replacing existing processes in a competitive environment is financially significant and involves substantial risk. However, the decision to adopt clean technologies and to incur the added costs of pollution reduction without governmental action is even more risky for two reasons. First, early in their life cycles, technologies and processes that are on the cutting edge of source reduction may cost more and be of lower quality than they will be when they become off-the-shelf technologies of the type described above (Groenewegen & Vergragt, 1991; Kemp, 1993). Second, the viability of new, clean technologies can be largely unknown, as are the economic consequences of their use (Kemp, 1993; Shrivastava, 1995a).

Regardless of industry context, prevention entails risk, but we argue that for two reasons, industry growth influences how returns to this risk affect profitability. According to discounted cash flow analysis, the level of an industry's growth moderates the expected probabilities of return (Brealey & Myers, 1991), because the expected payoff of any investment risk is higher in high-growth industries. Another factor relates to the technology life cycle (Abernathy & Utterback, 1978). In general, industry growth accelerates the maturation of a technology, which rapidly reduces the levels of risk inherent in investing in a long-lived technology at its emergent point. Thus, firms that invest in a pollution prevention policy, although adding to risk, also have a higher prospective return in a high-growth industry. Firms that fail to invest in newer technologies would suffer comparatively. Likewise, a pollution prevention policy will face a lower prospective return in a low-growth or declining industry. Rapid turnover of technologies in high-growth industries may also promote the learning-based organizational spillovers that were described above.

Organizational capabilities. Another major reason that we expected returns to environmental performance to be higher in high-growth industries involves organizational capabilities.[3] To make this argument, we refer to the two primary environmental thrusts discussed above: compliance, the so-called end-of-pipe approach, and prevention, the system that stresses source reduction and process innovation (Hart, 1995). Although a bureaucratic

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[3] We do not address the issue of human resources in this section (as we did in the analogous section on direct effects), as we feel that here most such arguments would be speculative. For example, one line of reasoning might run something like this: in high-growth industries, employee growth is higher, and firms will be less likely to suffer from the organizational inertia that blocks pro-environmental change (Shrivastava, 1995a). Such conditions might also provide "a climate conducive to risk-taking and persistent problem solving" (Drumwright, 1992: 32), which promotes environmental improvement.

management style may be matched to compliance, use of a more organic style is necessary to capture the gains associated with going beyond compliance, because the latter generates the type of innovative culture (Aiken & Hage, 1971) that enhances prevention efforts. The likelihood of an organic structure's being in place depends partly on industry growth.

Low-growth industries are more likely to be populated by mature firms selling standardized products (Hofer, 1975). Under such conditions, organizational structures can be expected to be hierarchical, inflexible, and bureaucratic (Burns & Stalker, 1961). Within such organizations, then, adopting policies and procedures associated with pollution prevention would be difficult, as they require a loosening of organizational structures and norms. Furthermore, such changes might well degrade performance if more mechanistic (Burns & Stalker, 1961) structures are associated with high performance in mature industries (Lawrence & Lorsch, 1967). For higher-growth industries, one would expect more organic structures to be in place, a situation that would facilitate pollution prevention efforts. An organic structure may also allow a firm that has more unabsorbed slack (Singh, 1986) to invest in environmental improvements.

Intangible resources. In this section, we discuss two intangible resources, reputation and political acumen. Both resources can work for or against a firm. With respect to reputation, we expect the connection between environmental performance and profitability to be stronger as industry growth rises. Assuming, as above, that consumers respond to reputations for environmental stewardship, the question is why such reputations are easier to construct in high-growth industries.

Growing industries are much more likely to experience entry by new players, and they are subject to methods and rules of competition that are still in flux (Porter, 1980). Initial reputations are still being established. If it is true that "the cumulative investments that firms consistently make in different domains over a long period of time are more likely to influence the cognitive interpretations of stakeholders" (Fombrun & Shanley, 1990: 254), then it follows (1) that an initial reputation is partly a matter of firm choice (for instance, trying to be known for being green versus being known for customer service) and (2) that once established, a reputation is difficult to change. This latter point is important, as firms in older, more mature industries tend to have preexisting reputations on numerous other dimensions. Shrum and Wuthnow (1988), for example, found that the performance-reputation association was tighter in photovoltaics, a growth industry, than in nuclear power, a mature industry. It is also true that when a firm is in an older, basic manufacturing industry, detriments to its reputation tend to affect consumer perceptions of the entire industry, as the Exxon Valdez disaster demonstrated (Jennings & Zandbergen, 1995; Koen, 1992). Such spillovers would tend to dampen the returns to positive environmental performance that occur in low-growth industries.

· A second intangible asset follows from an examination of political strategy. How would the development and use of political resources differ in

high- and low-growth industries? High-growth industries tend to be younger industries. Yoffie (1988) argued strongly for use, in such a setting, of a political strategy that stresses establishment of an institutional framework amenable to all players. That is, in a young industry the focus tends to be on the industry as a whole, and not on capturing direct firm-specific advantages vis-à-vis competitors.

In lower-growth industries, the situation is more complex. Political action in such settings is more proactive (Raelin, 1984). Here, political strategies tend to center on so-called rent-seeking (Buchanan, Tollison, & Tullock, 1980), the securing of competitive advantage via political means. Leone (1986) provided many examples of such tactics (generally, in accounts of mature industries), such as firms favoring pollution control regulation whose costs fell disproportionately on their competitors. Independent assessments of environmental performance, such as those developed by the Investor Responsibility Research Center (1995), often include expenditures for pollution control. In this case, a high-spending firm may appear to be more environmentally conscious, while actually impairing its cost position in its industry, and hence, its profitability.

In our discussion of the contrasting political tendencies of compliance and prevention firms in the preceding section, we noted that a compliance policy stresses a political strategy for competitive advantage, but a prevention policy stresses technical and organizational solutions instead. In a high-growth environment, the political actions associated with a compliance strategy are out of step with the needs and prevailing attitude of the industry and should yield less success. Likewise, success in lower-growth environments often demands reliance on the political strategies characteristic of a compliance policy.

The preceding remarks suggest that the growth rate of an industry moderates the connection between environmental performance and profitability. Hence,

> *Hypothesis 2. The level of an industry's growth will moderate the relationship between the environmental performance and profitability of firms in that industry; the greater the industry growth, the greater the positive impact of environmental performance on firm profitability.*

EMPIRICAL ANALYSIS

Sample, Methods, and Measures

We began with the group of firms assigned environmental ratings by the Franklin Research and Development Corporation (FRDC). This set of 477 firms spans all industrial classifications. We drew data on the firms for the years 1991 and 1992, using these years (1) because the first FRDC ratings

were made in 1991 and were based on data from that year and previous years[4] and (2) because two years seemed to us to represent an adequate period in which to test the influence of environmental performance, without letting too much time lapse between the measurement of the dependent and independent variables. The two-year period and lagging all independent variables that did not represent change scores by one year allowed us to test for causality.

We drew a number of financial statistics from COMPUSTAT for each company. We removed utilities, whose returns are subject to statutory limits; 70 observations per year were removed for this reason. Also removed were firms with missing data for one or more variables, predominantly the advertising, industry concentration, and firm sales growth variables. For 1991, 137 firms were excluded because of such missing data, and for 1992 exclusions were roughly the same. We then deleted a small number of observations for firms that had either grown or shrunk by more than 50 percent in either of the two years (3 firms in 1991). We used this procedure because these firms may have experienced major sell-offs, restructurings, or acquisitions that would have made them a source of bias (firms that had themselves been acquired were not rated by the FRDC). The predictive power of the models increased greatly after we removed these firms, which suggests that including them would have introduced misspecification to our models. Finally, we removed firms for which data were available for 1991 but not 1992, or vice versa (24 firms in 1991). The final sample size was 243 firms.

Environmental ratings were based directly on the scores given to the sample firms by the FRDC. These scores are based on a number of criteria, such as compliance records, expenditures, and other initiatives used to meet new demands, to reduce waste reduction, and to support environmental protection organizations. Thus, the ratings are well-matched to our theory, which explicitly highlights compliance and prevention efforts by firms. Not based on self-reports, the FRDC ratings correlate negatively and significantly with 1989 firm toxic releases per unit of sales ($p < .01$) and an index developed by the Investor Responsibility Research Center (1995) to track fines and penalties in 1989 ($p < .02$). The 1989 figures were the most recent figures available during 1991, as there is a lag between the reporting of such information and its issuance by the federal government. The ratings are internally adjusted for industry conditions, and virtually all industries contain firms with high and low ratings (a more complete description of the FRDC rating system appears in the Appendix). As the FRDC ratings were not systematically updated during this period, we held them constant for the two years.

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[4] Unfortunately, unlike many social science phenomena, such as product recalls, hostile acquisition attempts, and job changes, for which the number of discrete events in a year can be counted, assessments such as the FRDC ratings are difficult to associate with an exact time frame. This follows from the consideration of data from previous years in the decision calculus in a later year. Thus, we felt that it was proper to include 1991 data in our analysis. However, separate results for 1991 and 1992 are provided in our tabulated results.

We reverse-coded the FRDC scale to run from 1 to 5, so that high values reflect good environmental performance.

Our dependent variable was a company's return on assets, or ROA, a generally accepted measure of firm performance. In choosing control variables, we began with a list of the seven causal variables most prevalent in prior studies of performance (Capon, Farley, & Hoenig, 1990). These were industry concentration, firm growth rate, firm size, capital intensity, research and development intensity, advertising intensity, and market share. We dropped market share from consideration, because of a complete lack of data, and also dropped research and development, because many data were missing and the variable was consistently insignificant in trial regressions. We added industry growth rate, as our hypotheses cast this variable in a moderating role. Drawing on Capon and colleagues' (1990) findings, we expected the signs of these controls (including industry growth) to be positive, except for firm size, which had no consistent effect in that study, and capital intensity, which weighed in negatively when measured at the firm level.

We operationally defined the controls as follows: Industry concentration was measured as the four-firm concentration ratio at the four-digit Standard Industrial Classification (SIC) level and was taken from the *1987 Census of Manufactures* (U.S. Department of Commerce, 1992). Recently published reports now provide these data for nonmanufacturing firms for the first time (e.g., U.S. Department of Commerce, 1995). Firm growth rate was a firm's annual change in sales, expressed as a percentage. The natural logarithm of sales volume served as a proxy for firm size, and capital intensity was defined as the ratio of assets to sales. Industry growth was the average annual increase in sales for four years (1991 observations) or five years (1992 observations); we could not go further back because of the revision of the Standard Industrial Classification system in 1987. For industry growth, we used the most consistent set of data we found, from the U.S. Bureau of the Census, which provided numbers at the three-digit SIC level. Because we pooled two years of data, we included a dummy variable set equal to 1 if an observation was from 1991 and to 0 otherwise. The purpose of this variable was to pick up fixed effects that varied between the two years. All variables except for the FRDC ratings changed between 1991 and 1992.

As noted above, numerous firms had missing values for advertising intensity, so we undertook a special procedure to fill in these data (the figures provided above for missing data refer to conditions obtaining after the following procedure had been carried out). We began by measuring advertising intensity as annual expenses for that function divided by firm size. For a small number of observations, size was not available, so we used annual industry averages printed in *Advertising Age*.

To test Hypothesis 2, we used an interaction term formed by multiplying the FRDC environmental variable and industry growth. As is often the case, the interaction term was highly correlated with its constituents, a situation that can produce multicollinearity and unstable regression estimates. There-

fore, we employed the procedure suggested by Aiken and West (1991) to confront this problem. The Aiken and West approach calls for "de-meaning" (or centering) the direct terms by subtracting the mean of each variable from the values for each observation. Coefficient estimates for equations without the interaction term are not changed. More importantly, as we show below, the interaction term created by the multiplication of the two de-meaned direct variables displays little correlation with those direct terms when it is inserted thereafter.[5] We used ordinary least squares regression techniques. With only two years and 243 firms, we chose not to correct for autocorrelation under the assumption that our statistical approach should reflect our data, which look far more like a cross section than a time series.[6]

RESULTS

Descriptive statistics appear in Table 1. Correlations are generally low, with the exception of the relationship between the firm growth rate and ROA, and the industry growth and interaction terms, which are strong and positive. The last correlation provides initial support for Hypothesis 2. Of special note is the pattern of correlations between the interaction term and its constituent terms. Because we constructed the interaction term used in the correlations and regressions by multiplying the de-meaned industry growth and environmental ratings variables, correlations with those variables are modest, and one correlation is negative. If we had used an interaction term formed by simply multiplying together the industry growth and environmental ratings variables, their correlations with the interaction term would have been .95 and .28, respectively. Thus, our goal of constructing a meaningful test of direct and interactive effects by reducing multicollinearity was achieved.

Table 2 shows regression results with 1991 and 1992 data pooled. Model 1 includes the control variables. The coefficient on the firm growth rate is positive and highly significant, as is the coefficient on advertising intensity. Of the remaining control variables, capital intensity is significant and acts in the expected direction, firm size and the 1991 dummy variable are significant and positive, and the concentration ratio is insignificant. In this equation, industry growth is significant and positive, demonstrating an effect separate from that of firm growth. Thus, of five control variables for which we had prior expectations, four were significant predictors of profitability and acted in the expected direction. This observation added to our confidence in the regression modeling, because it indicated that we were picking

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[5] We thank an anonymous reviewer for suggesting this procedure.

[6] We also checked for the presence of heteroskedasticity in our estimation using an option available in the statistical package SHAZAM (White, Wong, Whister, & Haum, 1990). There is no single test for heteroskedasticity, and its presence could not be established. To double-check, we generated the regression equations again, employing White's (1980) correction for heteroskedasticity. Results were very similar to those we present here.

TABLE 1
Descriptive Statistics and Correlation Coefficients[a]

Variable	Mean	s.d.	1	2	3	4	5	6	7	8
1. Return on assets	4.11	7.99								
2. Firm growth rate	4.33	10.46	.45							
3. Advertising intensity	3.20	3.66	.17	.07						
4. Firm size[b]	8.17	1.22	.06	-.01	-.03					
5. Capital intensity	1.14	1.44	-.06	.01	-.05	.02				
6. Industry concentration	37.12	19.51	-.02	-.01	.08	.17	.01			
7. Industry growth rate[c]	4.69	3.30	.30	.20	.06	.00	.05	-.15		
8. Environmental rating[c]	2.86	0.60	.16	.13	-.01	-.06	.07	-.03	.01	
9. Industry growth rate × environmental rating[c,d]	13.45	10.18	.34	.21	.04	-.02	.07	-.12	.13	-.15

[a] $N = 486$. Correlations above .09 or below -.09 are significant at $p < .05$.

[b] Logarithm of sales.

[c] Mean and standard deviation refer to raw (uncentered) data. Correlations with all but the interaction term are unchanged by centering the variable.

[d] We calculated correlations using an interaction term created by multiplying the de-meaned (centered) industry growth variable and the de-meaned environmental rating variable.

TABLE 2
Regression Results, Pooled Data[a]

Variable	Model 1	Model 2	Model 3
Constant	−2.64	−2.86	−2.99
	(2.17)	(2.16)	(2.14)
Firm growth rate	0.31**	0.30**	0.31**
	(0.03)	(0.03)	(0.03)
Advertising intensity	0.26**	0.26**	0.27**
	(0.09)	(0.08)	(0.08)
Firm size	0.49†	0.54*	0.55*
	(0.27)	(0.26)	(0.25)
Capital intensity	−0.45†	−0.50*	−0.51*
	(0.25)	(0.25)	(0.25)
Industry concentration	−0.00	−0.00	−0.01
	(0.02)	(0.02)	(0.02)
Industry growth rate	0.55**	0.56**	0.52**
	(0.10)	(0.10)	(0.10)
1991 dummy	2.17**	2.14**	2.27**
	(0.62)	(0.62)	(0.62)
Environmental rating		1.49**	1.59**
		(0.52)	(0.52)
Industry growth rate ×			0.51**
environmental rating			(0.18)
R^2	.29	.30	.32
ΔR^2		.01	.01
F-test for ΔR^2		8.26**	8.18**

[a] $N = 486$. Standard errors are in parentheses. Significance levels are based on two-tailed tests (F-tests for ΔR^2 are one-tailed).
  † $p < .10$
  * $p < .05$
  ** $p < .01$

up the effects of previously established central tendencies in our models. Total explained variance is at or above levels obtained in other studies estimating return ratios and using control variables (e.g., Huselid, 1995; Ilinitch & Zeithaml, 1995; Tosi & Gomez-Mejia, 1994).

Model 2 tests Hypothesis 1 by including a direct effect for the environmental performance variable. Its coefficient is positive and significant at the $p < .004$ level, providing solid support for Hypothesis 1. Although the increase in the equation's R^2 is modest, it should be borne in mind that the equation already contains seven control variables. However, this increment in explained variance is highly significant, indicating that the impact of the environmental performance variable is not due to collinearity with other variables in the equation. Model 3 tests Hypothesis 2 by adding the interaction term to the regression equation. As with the addition of the environmental performance variable, the variance explained rises modestly, but significantly. The pattern of the coefficients on all the variables from the previous model changes little. Of particular importance is the fact that the

coefficients on the environmental performance variable and industry growth variables shift very little in either value or significance level, showing that our strategy of de-meaning those variables produced the desired stability in regression estimation. The interaction term is significant and acts in the hypothesized direction. Thus, our results show that although the contribution to the explained variance in firm performance made by our variables of interest is modest, higher environmental performance is associated with higher financial performance, and the relationship is strengthened as industry growth rises.

To explore this effect further, we evaluated model 2 by taking the partial derivative of the regression equation with respect to the environmental performance variable, yielding the following:

$$\delta(ROA)/\delta(environmental\ rating) = 1.59 + (0.51 \times de\text{-}meaned\ industry\ growth).$$

Setting this expression equal to 0 and solving for industry growth yields a value of −3.14 percent for de-meaned industry growth. That is, increasing environmental performance improved the bottom line in all cases where (de-meaned) industry growth was greater than −3.14 percent, which is true in virtually all of our data. Thus, our results indicate that "it pays to be green" as a rule, and that this relationship strengthens as industry growth increases. The industry context facing a firm is a key determinant of the effect of environmental performance on financial profitability, confirming Hypothesis 2.

To examine the robustness of our results, we split our data by year and conducted analyses of 1991 (models 4, 5, and 6) and 1992 (models 7, 8, and 9) separately. Results, shown in Table 3, provide support for our findings. In terms of our control variables, the value of the coefficients is quite consistent as we compare analogous models (for example, compare model 1 to models 4 and 7). But there are some shifts in significance levels. The coefficient on the environmental performance variable drops just below generally accepted significance levels in 1991 ($p \cong .10$ and .11 in models 5 and 6, respectively), perhaps because of the degrees of freedom lost by splitting the data. However, this variable is significant in 1992, as shown in models 8 and 9. The interaction term is significant in both 1991 and 1992. In all cases, the significance levels of the increases in variance explained follow the significance levels of the coefficients on the variables added. Our general conclusion, therefore, is that support for our hypotheses is robust.

CONCLUSION

In this concluding section, we return to our motivation for this study, review our results, and take a step back to try to place them in perspective. At this point, we feel it necessary to reiterate that our variables of interest do not account for more than a modest level of variation in firm performance. For example, in models 2 and 3 respectively, the variation explained rises by roughly 1 percent of the total variance and 4 percent of the explained vari-

TABLE 3
Regression Results, Individual Years[a]

	1991			1992		
Variable	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Constant	−1.42	−1.58	−1.70	−1.62	−1.93	−1.98
	(2.80)	(2.80)	(2.79)	(3.24)	(3.22)	(3.18)
Firm growth rate	0.37**	0.36**	0.36**	0.26**	0.25**	0.27**
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Advertising intensity	0.20†	0.21†	0.21†	0.26*	0.31*	0.32*
	(0.11)	(0.11)	(0.11)	(0.04)	(1.13)	(0.13)
Firm size	0.61†	0.64†	0.66†	0.39	0.46	0.46
	(0.34)	(0.33)	(0.33)	(0.39)	(0.39)	(0.38)
Capital intensity	−0.38	−0.41	−0.38	−0.60	−0.66†	−0.74*
	(0.33)	(0.33)	(0.33)	(0.38)	(0.38)	(0.38)
Industry concentration	−0.00	−0.00	−0.01	0.00	−0.00	−0.00
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Industry growth rate	0.29*	0.31*	0.28*	0.85**	0.83**	0.80**
	(0.13)	(0.13)	(0.13)	(0.16)	(0.16)	(0.15)
Environmental rating		1.13	1.10		1.60*	1.95*
		(0.69)	(0.69)		(0.77)	(0.78)
Industry growth rate ×			0.37†			0.76*
environmental rating			(0.22)			(0.29)
R^2	.33	.34	.35	.28	.29	.31
ΔR^2		.01	.01		.01	.02
F-test for ΔR^2		2.66	2.78*		4.28*	6.97**

[a] $N = 243$. Standard errors are in parentheses. Significance levels are based on two-tailed tests (F-tests for ΔR^2 are one-tailed).
  † $p < .10$
  * $p < .05$
  ** $p < .01$

ance. But given that a number of well-established control variables were entered into the equation, we consider the finding of relatively consistent patterns of significance and coefficients on our variables of interest of clear scholarly value. In the remarks that follow, we attempt to provide further insight on the issues raised, while staying within the bounds of what our data analysis yielded.

Returns to Corporate Social Performance: Inching Closer to Resolution

Wood and Jones (1995) attributed the inconsistent statistical findings on the relationship between corporate social performance and economic performance to "stakeholder mismatching," or comparing the economic outcome desired by one set of stakeholders (e.g., shareholders) to corporate actions desired by another set of stakeholders (e.g., environmental activists). For example, the fact that profit and corporate crime are positively correlated (Baucus & Near, 1991) might be due to the fact that such behavior often results in no traceable cost or consumer reaction.

In many settings, this interstakeholder dichotomy is a sharp one, and it

generates equivocal findings with respect to how corporate social performance affects profits. However, we emphasize that the interests of distinct stakeholders are not orthogonal as a rule, or even necessarily aligned unevenly. Indeed, the *Economist* has argued that society is entering "the era of corporate image, in which consumers will increasingly make purchases on the basis of a firm's whole role in society: how it treats employees, shareholders, and local neighborhoods" (1994: 71). Thus, to the extent that actions by downstream users and consumers elicit desired corporate behavior, stakeholder interests may parallel one another. As a social issue, environmental concerns are somewhat unique in terms of how strongly they appear to be manifested in the marketplace. This occurs because environmental concern correlates strongly with income, and therefore with purchasing levels (Roper Organization, 1990). But it should be noted that since the relative influence of consumers is not democratic but is based on what they spend, marketplace outcomes will not always reflect social equity considerations.

Factors internal to firms also result in environmental concerns being a unique social issue. Our theoretical development is in broad agreement with Post (1991) and Post and Altman (1992), who argued that environmental issues are more systemic than other social issues and affect a broader constellation of organizational functions. In fact, the recently developed ISO 14000 international environmental management standards aim to institutionalize the idea of a systemic approach (Tibor & Feldman, 1996). Throughout our application of the resource-based view of the firm, this systemic dimension of environmentalism underlies our theory of how proactive policies translate into internal competitive advantages. By way of contrast, a good example of a corporate social policy that lacks this systemic nature would be investment in South Africa, which would tend to be more separable from the core elements of a firm. This observation could help to explain Meznar, Nigh, and Kwok's (1994) finding that announcements of withdrawals from South Africa resulted in losses in shareholder wealth.

Taken as a whole, our study indicates that the resource-based view of the firm can be applied fruitfully to corporate social responsibility issues. This in turn suggests a greater breadth of application for resource-based theories. Our dependent variable in this case is economic performance, but our overall thrust is consistent with a theoretical framework that could predict corporate social responsiveness or choice of political strategy. Hart (1995) used such an approach, positioning social legitimacy as a performance criterion when he applied resource-based theory to corporate environmental performance. To the extent that corporate social policies are systemic, this view may explain the type of social complexity underlying some forms of sustainable competitive advantage.

The Moderating Influence of External Conditions on Corporate Strategy

We found evidence that the connection between environmental performance and economic performance strengthens in higher-growth industries. Although the idea that outcomes of more traditional organizational initia-

tives and strategies are partially contingent on external environments is well-established (Prescott, 1986), our study extends this notion to encompass environmental initiatives. The results also square with Collis and Montgomery's (1995) assertion that fitting internal resources to external demands is a critical strategic issue.

If in the long run the external constraints on firms are not legal or regulatory, but physical (Hart, 1985), firms will need to be even more attentive to those demands. Prospering under such conditions will demand innovative thinking. Perhaps one avenue open to managers is to use their capabilities and resources to push an industry through what Shrivastava (1995b) called "eco-renewal" and find ways to improve industry growth through environmental initiatives. Such a renewal would benefit a firm not only directly, but also indirectly, by changing the nature of the competition it faces in ways that enhance returns to its resource base.

Our theory led us to believe that industry growth moderates the relationship between corporate social policies and performance. Might other variables also influence this relationship? The answer almost certainly is yes. In studying the complexities of industrial change, Mitchell recognized the necessity "to treat some factors as independent in what we recognize is really a non-linear multi-equation system and probably a chaotic one at that" (1989: 227). We have made simplifying assumptions here, and subsequent research may identify other causal agents that act on our system of variables.

Identifying Research Needs

Although in our analysis, the benefits of improved corporate environmental behavior appear to outweigh its costs, the exact calculus of this comparison is by no means clear and demands further examination. One conspicuous research implication is that if superior environmental performance drives higher returns, researchers need to identify the full chain of variables connecting the end links. If, as we assert, company-initiated policies play a role in improving economic performance, an important study could follow companies before and after important pro-environment changes, to gain insight on which policies yield the most acute bottom-line effects. Researchers are likely to find that better information on these policies is needed. It would also be helpful to understand where returns to environmental performance end. That is, at some point, do resources become so focused on environmental issues that a firm shortchanges other key functions, such as customer service?

Research that is explicitly longitudinal would also offer benefits. If one accepts the proposition that industries generally move from high growth to lower or even negative growth (Hofer, 1975), then with respect to environmental performance, a logical outcome of our study is that the resource endowment of a firm will have to change accordingly, because the resource base that yields rents in the early stage may be less productive thereafter. For example, the resources represented by political strategy will need to evolve with time. This process of developing new capabilities is fraught with dif-

ficulty, and we agree with Barney (1986) that how firms recognize the need to change key resources over time and act upon these imperatives is a subject that deserves further development.

Also poorly understood is the precise role of consumption behavior in the social performance–economic performance equation. Empirical analysis of the purchasing behavior of downstream users and consumers with respect to environmental product attributes is clearly warranted. One research project with great potential returns would be a panel study of downstream users and consumers that followed purchases across time and could track what influenced the change to and continued purchase of green products. It could also confirm how closely actions match attitudes.

Managing for Environmental Quality and Economic Performance

As noted above, a general danger with shaping a firm's resources for the long run is that industry transitions may render previously critical resources of marginal value. If, as Hart (1995) suggested, industrial society will evolve to the point where sustainable development is the norm, then technological, organizational, and human resources that serve a firm's environmental aims now should be even more valuable then. But protecting and enhancing the value of resources requires careful oversight and supportive actions. For example, a firm's pro-environment reputation demands continued investment in consistency of action, so that the firm's advantage does not erode from within. As recent attacks on The Body Shop have shown (Entine, 1995), although there is considerable "unclaimed reputation 'space' with respect to corporate environmental performance" (Hart, 1995: 995), significant risks await firms that do not hold true to expressed principles.

One keystone issue for corporations is how to treat existing environmental standards. There is evidence that many corporations regard pollution limits as minimums and try to exceed minimal compliance levels and position themselves for future changes in policy (*Business Week*, 1990). This would appear to be a wise strategy, as increased popular interest in the environment may translate into a tightening of standards. In fact, in the specific context of environmental regulations, the idea of trying to burden competitors with greater regulatory mandates via the pursuit of regulation that is asymmetric across competitors (Leone, 1986) could actually backfire if consumers reward consistent excellence in this regard. Furthermore, the increasing availability of environmental information "implies that the laggards in environmental performance will more likely suffer at the hands of consumers, while those following an effective proactive approach will thrive" (Dean, Fowler, & Miller, 1995: 12).

Another reason to go beyond compliance is that the organizational innovation with which such a strategy is associated is well matched to the trend in environmental regulation itself. The pattern of regulatory legislation in America appears to be evolving from one of "command and control" to one that uses market-like mechanisms, such as offsets, "bubbles," and tradable emissions permits, to achieve environmental gains (Hahn & Hester,

1989). Such a trend will benefit firms that have promoted flexibility in their approach to environmental policy, because using market tools to improve the environment allows firms to tailor their responses to their own needs and to seek innovative solutions to meeting their responsibilities. More generally, however, we believe that moving aggressively toward environmental improvement will help firms to become more entrepreneurial on a number of key dimensions that we have noted above.

Cairncross labeled the rise of environmental concern "perhaps the biggest opportunity for enterprise and invention the industrial world has ever seen" (1992: 177). We have not identified and measured every link in a complex causal chain, but our study suggests that shrewd managers have recognized this possibility and set to work assembling the organizational resources necessary to capitalize on this opportunity. Managers who instead resist and contest pressures for environmental improvement risk not only a profound loss of productive energy, but also a bottom-line loss of equal proportions.

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APPENDIX

The Development of the Environmental Ratings Used in This Study

The following are excerpts from the Franklin Research and Development Corporation's 1989 publication, which provides a concise statement of what each rating indicates. The FRDC lists these four specific questions it asks when evaluating companies:

Is the company in compliance with state and federal environmental regulations? Does it have major environmental lawsuits pending? Does it have a record of environmental controversy? Has it gone beyond the letter of the law in dealing with pollution problems?

Where comparative environmental studies of an industry have been conducted, how has the company performed relative to others in its industry?

What efforts has the company made in reducing the generation of hazardous wastes and in the proper disposal of those wastes it generates?

Does the company contribute to, or otherwise support, nonprofit environmental protection organizations?

We transformed the FRDC ratings to the following numbering system, under which high numbers mean better environmental performance.

5: The company has taken exceptional initiatives in environmental matters with a reputation for going beyond its peers in pollution control or hazardous waste reduction. The company has shown unusually strong support for environmental organizations.

4: The company has demonstrated a strong concern in limited areas for the environment. It has no major environmental controversies pending. It has been moderately supportive of environmental organizations.

3: The company has an environmental record that is mixed, distinguishes itself neither

positively nor negatively on the environment, or is not in an industry with substantial environmental challenges.

2: The company has an environmental record characterized by occasional major environmental controversy or litigation. It has fared poorly in environmental studies of its industry.

1: The company has a consistent history of pollution control or other environmental problems. The company is currently at the center of a major environmental controversy where the responsiveness of its actions are questionable. It has taken few or no steps to support environmental organizations.

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SEEING THE BIG PICTURE: THE INFLUENCE OF INDUSTRY, DIVERSIFICATION, AND BUSINESS STRATEGY ON PERFORMANCE

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Much of the strategic management literature separates industry, corporate, and business levels of analysis, and empirical studies tend to examine these levels independently, not addressing how industry context influences diversification and how diversification strategy might influence business strategies. This article examines the interactions of industry characteristics, diversification, and business strategy in an integrated framework and offers a comprehensive model illustrating how these factors combine to influence performance. We tested the model using data from a sample of *Fortune 500* firms.

I would say going back one, two, or three years ago, that due to the constraints of the profit-sharing and the incentive program for the divisions, we probably underinvested in our two growth businesses . . .
    We were doing very well but we were underinvesting in what turned out to be a very high-growth industry. We weren't putting in the marketing dollars and we weren't putting in the R&D dollars. We were growing . . . at close to 20 percent, however, the semiconductor market was growing at 30 percent. So we were losing market share and didn't know it.
            From *The Dexter Corporation* (White, 1979: 12–13)

    The above excerpt from a well-known case study published by the Harvard Business School suggests the complexities associated with the management of large diversified firms. In this particular case, the Dexter Corporation had diversified into profitable coating and molding powder businesses that served the rapidly expanding semiconductor market but failed to make adequate investments in these businesses. As a result, Dexter's market share declined, and the company's overall performance no doubt suffered.
    The strategic management literature provides less than definitive prescriptions for Dexter's managers and the managers of other diversified firms.

Many researchers have examined the impact of diversification on firm performance (Datta, Rajagopalan, & Rasheed, 1991; Hoskisson & Hitt, 1990; Ramanujam & Varadarajan, 1989); others have studied the relationship between business strategy and firm performance (Dess, Gupta, Hennart, & Hill, 1995); and still others have sought to assess the relative contributions of industry membership, diversification, and business strategy on business-unit performance (Rumelt, 1991; Schmalensee, 1985; Wernerfelt & Montgomery, 1988). Yet none of these research streams has produced conclusive findings. We argue that definitive findings remain elusive because strategic management researchers have created a false separation among the industry, corporate, and business levels of analysis. Thus, studies fail to consider how industry context influences diversification decisions and whether or how diversification strategy might influence the formulation and implementation of business strategy.

This study therefore addresses a critical gap in the strategy literature by offering a comprehensive framework that integrates industry characteristics, diversification, and business strategy and examining how these factors influence each other and overall performance levels. Like Dess and colleagues (1995), we argue that researchers can gain new insights by examining how industry contexts, diversification, and business strategy are interrelated. This approach has the advantages of addressing how environmental factors influence decisions about corporate diversification and of also recognizing that diversification strategies are likely to influence strategic decision making at the business level.

The major contribution of this study is that it explicitly addresses indirect influences on performance outcomes. For example, many studies have examined the influence of industry membership and diversification on performance outcomes, but few studies have considered or empirically tested the possibility that these factors might also have important indirect influences on performance because of their effects on the formulation and implementation of corporate and business strategies. Such an integrated perspective is consistent, however, with the conclusions of Grant, Jammine, and Thomas (1988) and of Dess and colleagues, who recently argued that most studies have examined "the relationship between strategy and performance without considering the role played by corporate strategy in creating and sustaining competitive advantage at the business level" (1995: 358).

RESEARCH MODEL

In this study, we sought to go beyond showing statistical associations among variables. Instead, we sought to explain how industry, diversification, business strategy, and performance variables are related and why certain decision and performance patterns are found. The model therefore integrates industry, diversification, and business strategy variables in a path-analytic framework (James & Brett, 1984). Figure 1 illustrates the model, and the next several sections describe the hypothesized relationships.

FIGURE 1
Research Model Showing Hypothesized Relationships
among the Variables[a]
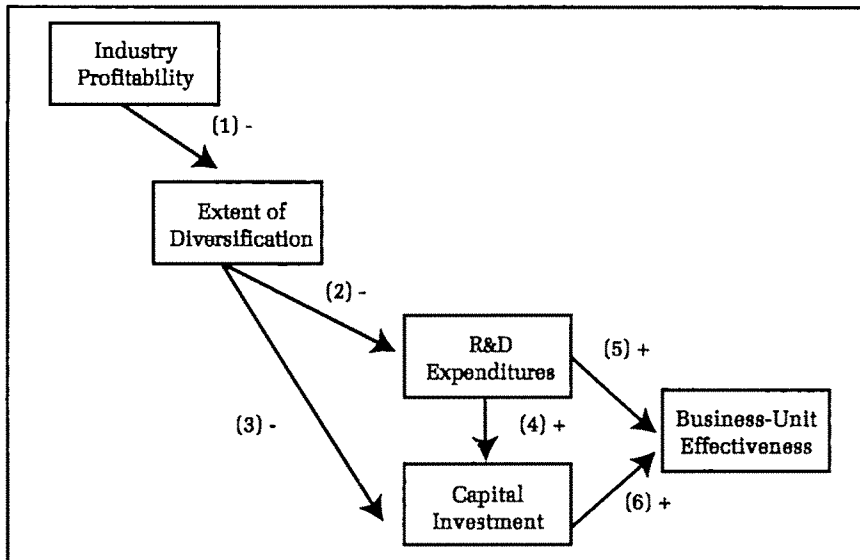
[a] Numbers in parentheses refer to hypothesized relationships.

How Industry Context Influences Diversification Strategy

Early industrial organization researchers concluded that differences in profitability across firms could be largely explained by industry membership and that industry performance levels could be explained by barriers to entry and other structural characteristics (Bain, 1956; Scherer, 1980). The most noteworthy expression of this perspective is found in an article by Schmalensee (1985) that assessed the relative influences of industry, firm, and market share effects on business unit profitability. Using cross-sectional data from the 1975 Federal Trade Commission Line of Business database, Schmalensee concluded that industry membership exerted considerable influence on profitability, but that market share and firm effects were either negligible or nonexistent.

The strategic implications of Schmalensee's findings would appear to be straightforward: Firm performance is a function of operating in profitable industries, and the way for firms to improve performance is to diversify into more profitable industries. Such a prescription certainly has some merit, and industry selection surely has the potential to exert considerable influence on performance. But Schmalensee relied on cross-sectional data analysis, so he could not consider the impact that industry profitability might have on firm-specific strategic decision making *over time*. A strategic choice perspective would suggest that firms are likely to respond to industry conditions by

adopting unique strategies and that the choice of specific strategies and the effectiveness of their implementation will lead to wide differences in firm performance outcomes, even among firms in the same industry or industries. Rumelt's (1987, 1991) research supports this view. After analyzing the rates of return of 1,292 U.S. corporations over a 20-year period, he found that "the variance in long-run profitability within industries is three to five times larger than the variance across industries" (1987: 141).

Newer thinking in industrial organization economics has begun to embrace the view that industry structure and profitability will influence firms to pursue strategies aimed at changing their competitive contexts (Cowling & Waterson, 1976; Jacquemin, 1987; Kwoka & Ravenscraft, 1986; Seth & Thomas, 1994). According to this perspective, firm strategies may actually be quite proactive. Jacquemin (1990) concluded, for example, that mergers and acquisitions should be viewed as strategies for changing market structure and improving performance and that firms will pursue these diversification activities when they confront greater competitive pressures. In an early diversification study, Christensen and Montgomery (1981) suggested that firms located in markets that constrain their growth or profitability are likely to pursue more diversification activity. Such a view echoes a hypothesis originally proposed by Rumelt, that "for a great many firms, diversification is the means employed to escape from declining prospects in their original business area. Poor absolute performance is often the result of participation in a highly competitive noninnovative slow growth industry" (1974: 82).

Rumelt's "escape hypothesis" has received very little empirical study. Some studies have examined how firm performance, rather than industry profitability, influences diversification activity. For example, Grant and colleagues (1988) concluded that low firm performance in an initial time period is associated with higher levels of diversification in subsequent time periods. Similarly, Chang and Thomas (1989) found that firms that are performing poorly tend to engage in more diversification activity but that this activity does not necessarily improve their performance.

Our first hypothesis examines the view originally articulated by Rumelt (1974) and also suggested by Christensen and Montgomery (1981) that low industry profitability will lead to more extensive diversification.

> *Hypothesis 1. The profitability of the industries in which firms compete will have a negative influence on the extent of firm diversification.*

Direct and Indirect Influences of Diversification Strategy on Performance

As the prior section suggests, few researchers have examined the question of why firms diversify or studied the direction and rate of diversification activity. Ansoff (1965) proposed that firms expand along a particular growth vector, seeking to broaden markets for existing products, develop new products for existing markets, or diversify into totally new product markets, depending on the opportunities associated with these different options. Dess

and colleagues (1995) reviewed the theoretical literature and identified four potential sources of economic benefits for diversified firms, including economies of scope, superior internal governance mechanisms, the transfer of core competencies across businesses, and the joining of complementary assets. They noted, however, that few researchers have specifically examined the benefits associated with various diversification strategies or sought to understand how diversification influences strategic decision making at the business level.

Instead, most diversification research has followed the lead of Rumelt's (1974) landmark study, examining the relationship between diversification strategy and performance. Rumelt concluded that firms pursuing related diversification strategies enjoy higher levels of performance than firms pursuing unrelated diversification strategies, and many subsequent studies have supported this finding (Bettis, 1981; Christensen & Montgomery, 1981; Gahlon & Stover, 1979; Mason & Goudzwaard, 1976; Melicher & Rush, 1973; Rumelt, 1982). These empirical studies lend support to theoretical arguments suggesting that a limited amount of diversification into related businesses can have a positive impact on performance by allowing firms to make better use of the resources of a core business (Penrose, 1959; Rumelt, 1974, 1982) or to share resources across businesses (Chatterjee & Wernerfelt, 1991; Teece, 1982; Wernerfelt, 1984; Wernerfelt & Montgomery, 1986, 1988). This line of reasoning also suggests, however. that diversification beyond some point yields fewer opportunities to achieve synergies, and extensive diversification is assumed to have a detrimental impact on firm performance. A recent study by Comment and Jarrell (1995) supports this view; those authors found that widely diversified firms that "de-diversified" enjoyed subsequent improvements in stock market performance.

Grant and his coauthors (1988) specifically hypothesized that high levels of diversification would be associated with high firm performance but that beyond some point, increasing levels of diversification would be associated with lower firm performance. Lubatkin and Chatterjee (1991, 1994) tested similar models, suggesting that single-business and unrelated diversification strategies would be associated with less attractive risk and return profiles but that related or constrained diversification strategies would be associated with more attractive risk and return profiles. These studies showed some support for the predicted curvilinear relationship between diversification strategy and firm performance. Lubatkin and Chatterjee also concluded that these relationships were temporally stable through swings in business economic cycles. Grant and colleagues noted, however, that the importance of findings about the diversification-performance relationship is tempered by the fact that diversification strategy variables tend to account for only "a small proportion of interfirm differences in profitability" (1988: 795)—a finding common to nearly all studies that have examined the relationship between diversification and firm performance (Prahalad & Bettis, 1986; Wernerfelt & Montgomery, 1988).

In spite of considerable study, however, no theoretical perspective on

the relationship between diversification strategy and performance has received unequivocal support. Although many studies have shown at least limited support for negative or curvilinear relationships between diversification and firm performance, many other studies (Bettis & Hall, 1982; Lubatkin, 1987; Michel & Shaked, 1974; Weston, Smith, & Shrieves, 1972) have shown that extensive or unrelated diversification can be more, or certainly no less, advantageous than related diversification. .

Thus, the literature has so far failed to provide a definitive explanation of the relationship between strategic decision making at the corporate level and performance outcomes. Some reviews of the literature have suggested that methodological issues can explain inconsistencies in research findings. For example, Bettis and Hall (1982) concluded that Rumelt's (1974) findings may have been influenced by the high returns of the pharmaceutical firms in his sample, many of which were pursuing related diversification strategies. Subsequent studies that have controlled for industry membership have, however, revealed few new insights (Grant et al., 1988; Rumelt, 1982). Other reviews have suggested that differences in the operational definition of diversification strategy across studies may be responsible for inconsistent findings; yet regardless of the diversification measure employed, no study has demonstrated that diversification strategy explains much variation in firm performance.

A more plausible explanation for the inconsistencies among research findings may be the failure of empirical studies to explicitly address the indirect influences of diversification on performance outcomes. Many authors have implied that diversification affects performance through its impact on intervening variables, but only a few studies have incorporated such variables (Bettis, 1981; Christensen & Montgomery, 1981), and no study develops a framework or model that describes the relationships among diversification strategy, intervening variables, and performance. In short, most empirical studies have either ignored or failed to address how diversification strategy affects performance outcomes.

A key theme in the conceptual literature is the suggestion that diversification may influence performance indirectly by increasing administrative complexity and bureaucratic costs. Sutherland (1980) and Jones and Hill (1988) argued that the diseconomies associated with administrative complexity grow so quickly that they can soon overwhelm any potential economies of scale or scope offered by diversification. Moreover, as firms diversify further away from their core businesses, managers are less likely to have an intimate understanding of their firms' disparate businesses or markets. Poor decision making can follow, with lower performance levels an inevitable result. This perspective is best summarized by Grant and his coauthors, who argued that "firms face constraints on the amount of product diversity they can successfully manage" (1988: 793).

Furthermore, the financial controls employed by diversified firms may instill in business-unit managers a short-term orientation that discourages risk taking, research and development activities, and investment in new

plant and equipment (Hoskisson & Hitt, 1988). The possibility that diversi-
fication might foster a short-term, low-risk orientation has been recognized
for some time now. More than 20 years ago, Bower noted that

> the risks to the division manager of a major innovation can be
> considerable if he is measured on short-run, year-to-year, earn-
> ings performance. The result is a tendency to avoid big risky bets
> ... new developments are, with few exceptions, made outside
> the major firms in the industry [and] the diversified companies
> give us a steady diet of small incremental change (1970: 194).

The combination of administrative complexity, poor strategic decision
making, and the financial controls employed by large diversified firms may
lead to poor management of business units, or to underinvestment in busi-
ness opportunities, or to both (Loescher, 1984). Any of these outcomes will
hurt the competitiveness of a firm's business units. The scenario described
here intimately links corporate and business strategies, illustrating how a
firm's diversification decisions may have important impacts on the way its
businesses are managed and operated.

The excerpts from the Dexter Corporation case found at the beginning of
this article reflect this possibility. In this Harvard Business School case,
Dexter's financial controls required all divisions to be self-supporting, and
the company's incentive bonus system rewarded division managers largely
on the basis of their divisions' returns on assets. Thus, division managers
had almost no access to capital from outside their divisions, and every dollar
spent on marketing and R&D would lead to lower bonus payments. These
controls and incentives almost certainly discouraged investment in the com-
pany's high-growth businesses.

A few research studies have examined the relationship between diver-
sification and strategic decision making at the business level. For example,
Bettis (1981) and Bettis and Mahajan (1985) found that firms pursuing re-
lated diversification strategies had higher levels of advertising, R&D ex-
pense, and capital investment. Similarly, Hoskisson and Hitt (1988) found
that single-business firms and firms with dominant businesses had higher
levels of R&D than firms pursuing either related or unrelated diversification
strategies. Hill and Snell (1989) also concluded that lower levels of diversi-
fication were associated with higher levels of R&D expense.

Thus, although most empirical studies have focused on the direct rela-
tionship between diversification strategy and performance, the conceptual
literature and a few empirical studies make a strong case for focusing more
attention on how diversification strategy influences decisions made at the
business-unit level (Dess et al., 1995). Diversification will have a significant
indirect and negative impact on performance if, as some researchers have
suggested, it leads to underinvestment in new product and process tech-
nologies, thereby reducing effectiveness and competitiveness at the business
level. This important possibility may well be implied in many diversifica-
tion studies, but it has failed to receive adequate empirical study. To exam-

ine the possibility that diversification might have an indirect influence on performance by affecting other strategic decisions, we offer two hypotheses:

> *Hypothesis 2. The extent of diversification will have a negative influence on the level of R&D expenditures.*
>
> *Hypothesis 3. The extent of diversification will have a negative influence on the level of capital investment.*

The Influence of Business Strategy on Business-Unit Effectiveness

Success can be achieved in many ways and through the pursuit of many different strategies. For example, firms often seek to gain major market share positions in attractive industries to enhance their market power. Similarly, firms that are concerned about the long-run viability of their current markets will view diversification strategies that reduce their reliance on those markets as successful. Although the composition of a firm's portfolio of businesses may exert considerable influence on its performance, a firm's overall success will almost certainly be influenced by the effectiveness of its businesses relative to the effectiveness of their rivals. If, when compared with their rivals, a firm's businesses achieve "the greatest output for the least input" (Mott, 1972: 17; Mueller, 1990), then these businesses are likely to enjoy a considerable advantage over their less competitive rivals (Drucker, 1986).

Hayes and Abernathy (1980) and Melman (1983) argued that an emphasis on business-unit effectiveness was once deeply ingrained into American management practices. In the short run, this emphasis took the form of managing assets as efficiently as possible. In the longer run, this emphasis encouraged managers to increase labor productivity by investing in capital equipment, while also focusing on the development of new products and processes that would open new markets and reinvigorate existing ones (Hayes & Abernathy, 1980: 68). Hayes and Abernathy argued persuasively, however, that management practices in the post–World War II era, and especially during the 1960s and 1970s, tended to focus on acquisition and divestment activity and financial control and portfolio management techniques, while either ignoring or giving short shrift to effectiveness considerations.

Nearly all of the studies examining business effectiveness underscore the importance of R&D spending and capital investment in the development of new product and process technologies (Franko, 1989; Griliches, 1986; Hill & Snell, 1989). Furthermore, studies have shown wide variations in R&D spending across firms, industries, and national contexts (Hayes & Abernathy, 1980; Melman, 1983). Research suggests that although many firms tend to see R&D as a discretionary expense to be cut when sales fall below expectations, other firms see R&D as an important driver of product and process innovation. Comments by a managing director of Kawasaki Steel's research labs indicating that "we won't cut R&D unless there's absolutely

nothing else left to cut" illustrate the commitment to R&D spending among these more progressive firms (Yoder, 1987).

Griliches (1986) examined R&D spending in the United States, and Bacon and Eltis (1978) studied the impact of R&D spending on the British economy; these authors concluded that R&D, and especially spending for basic research, contributed significantly to business competitiveness. Griliches summarized his findings by noting that "the overall slowdown in the growth of R&D and the absolute decline in basic research in industry which occurred in the 1970s may turn out to have been very costly to the economy in terms of foregone growth opportunities" (1986: 153).

In what is probably the most comprehensive analysis of the relationship between R&D spending and business performance, Franko studied the competitiveness of businesses in six industries and concluded that "commercially oriented R&D activity, funded out of corporations' own resources, is an important determinant of . . . performance relative to competition in a broad range of industries" (1989: 470). He also concluded that many U.S. businesses lost their shares of worldwide markets by failing to match their Japanese and European competitors' commitment to R&D.

A number of empirical studies have examined the link between R&D spending and the development of new product and process technologies, and all of these studies have provided support for a causal relationship indicating that R&D spending generates new product and process improvements (Branch, 1973; Franko, 1989; Leonard, 1971; Mansfield, 1968; Scherer, 1976). Capital investments are then required so that firms can exploit new technologies and bring promising product innovations to market or implement cost-reducing production processes.

Investments that result in new products or improvements in production methods allow businesses to charge higher prices or enjoy lower costs than their rivals; in either case, these businesses are more effective. Process R&D and investments and improvements in production processes should lead to lower unit costs. Product R&D and investments in the development and marketing of new products and services should allow firms to charge higher prices. Thus, both cost leadership and differentiation strategies can be effective; the former increase profit margins by lowering costs, and the latter increase profit margins by allowing firms to charge higher prices for products that are perceived as unique. In fact, many different business strategies can be effective so long as they provide business units with advantages over their rivals. Furthermore, defining business-unit performance in relative terms provides a way to compare the effectiveness of cost leadership, differentiation, and other business strategies.

A perfect analogy is found in the ready-to-eat breakfast cereal industry. Kellogg and General Mills currently are often able to command prices of $4 per box or more, while comparable store brands often sell for less than $2 per box. Kellogg and General Mills probably incur higher unit costs than the store brands to pay for advertising and promotion, higher-quality packaging, and overhead (though Kellogg and General Mills probably also enjoy econo-

mies of scale that offset at least some of these higher costs). Yet the differentiation strategy pursued by both firms remains effective because the ratio of outputs to inputs generated by this strategy exceeds the ratio achieved by the store brands pursuing their low-cost strategy.

Although R&D and capital investment may not be the only two factors that contribute to business-unit effectiveness, the literature has emphasized their importance and also suggested links between diversification and these two factors. Furthermore, our framework suggests that these two factors could be the links through which diversification affects performance outcomes indirectly. We summarize relationships among strategic decision making at the business level and business-unit effectiveness in three hypotheses:

> *Hypothesis 4. The level of R&D expenditures will have a positive influence on the level of capital investment.*
>
> *Hypothesis 5. The level of R&D expenditures will have a positive influence on business-unit effectiveness.*
>
> *Hypothesis 6. The level of capital investment will have a positive influence on business-unit effectiveness.*

METHODS

Time Frame and Variables

Previous studies that have examined relationships among diversification, business strategies, and performance have typically used measures that were three-, four-, or five-year averages (Bettis, 1981; Christensen & Montgomery, 1981; Palepu, 1985). However, our path-analytic framework and its hypothesized causal relationships suggested the need to test a lagged model. One disadvantage of a lagged model is that it can introduce unwanted noise into an analysis (since, as is widely known, R&D expenditures and capital investment are highly influenced by business cycles in the macroeconomic environment). Accordingly, to examine lagged effects while also minimizing the influence of business cycle fluctuations, we chose the years 1984 through 1987 as the time frame for our study. Furthermore, although much of the existing diversification literature draws on data from the 1970s—a period of business and economic volatility—the time frame covered in this study (the mid-1980s) was marked by continuous economic expansion and an absence of wide cyclical and inflationary variation. By incorporating data from a period of economic growth and relative price stability, this study provides an important addition to the strategy literature.[1]

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[1] Between 1973 and 1980, sluggish economic growth held average annual increases in the gross national product (GNP) and the industrial production index to 2.3 percent and 2.9 percent, respectively. During this same period, the producer price index rose at an average annual rate of 13.8 percent. In contrast, the time frame of this study (the mid-1980s) saw GNP and the industrial production index grow at average annual rates of 4.8 percent and 4.7 percent, respectively, and the producer price index grew at an average annual rate of only about 1.0 percent.

The influence of industry membership is represented in our study by average industry return on assets for the year 1984. Our measure of industry profitability was a weighted average of the profitability of all of the industries in which our sample firms participated and was calculated as:

$$\text{Average industry return on assets} = \sum m_{ij4}ROA_{j4},$$

where m_{ij4} is the proportion of firm i's sales in four-digit industry j and ROA_{j4} is the return on assets in four-digit industry j.

Diversification was assessed by an entropy measure used by Palepu (1985), Davis and Duhaime (1992), and many others. This continuous measure uses Standard Industrial Classification (SIC) codes to identify and evaluate the extent of diversification, and tests of its validity have supported its use (Hoskisson, Hitt, Johnson, & Moesel, 1993). The extent of diversification, assessed for the year 1985, was calculated as:

$$\text{Diversification} = \sum [(m_{ij4}/m_{ij2})\ln(m_{ij2}/m_{ij4})]m_{ij4} + \sum m_{ij4}\ln(1/m_{ij4}),$$

where m_{ij4} is the proportion of firm i's sales in four-digit industry j and m_{ij2} is the proportion of firm i's sales in two-digit industry j.

The data used to measure R&D expense and capital investment were from the year 1986. Because R&D and investment levels differ widely across industries, we controlled for these industry differences (Dess, Ireland, & Hitt, 1990); the respective formulas for assessing levels of R&D and capital investment were the following:

$$\text{R\&D expenditures} = R\&D_i - \sum m_{ij4}R\&D_{j4}$$

and

$$\text{Capital investment} = \text{capital investment}_i - \sum m_{ij4} \text{ capital investment}_{j4},$$

where $R\&D_i$ and *capital investment*$_i$ are the ratios of R&D expense and capital investment to sales for each firm i, m_{ij4} is the proportion of firm i's sales in four-digit industry j, and $R\&D_{j4}$ and *capital investment*$_{j4}$ are the mean ratios of R&D expense and capital investment to sales in four-digit industry j.

To assess business-unit effectiveness, we needed a relative measure that would not only allow evaluation of businesses' prices and costs (i.e., the value of outputs and the value of inputs), but would also address the performance of business units relative to their rivals. Because margins can vary widely across industries and because we were interested in the performance of business units relative to their rivals, we assessed business-unit effectiveness by calculating a weighted average of the operating margins of each firm's business units adjusted for industry membership:

$$\text{Effectiveness} = \sum m_{ij4} (\text{operating margin}_{ij4} - \text{operating margin}_{j4}),$$

where m_{ij4} is the proportion of firm i's sales in four-digit industry j in 1987, *operating margin*$_{ij4}$ is the operating margin for each of firm i's business units in 1987, and operating margin$_{j4}$ is the operating margin in four-digit industry j in 1987.

Many of the variables used in this study were either industry means or were adjusted using industry means. Past studies requiring industry means have used the industry average of firms' primary or largest business units. Since conditions and performance levels can vary widely across the industries in which multibusiness firms compete, such averages are incomplete and possibly misleading for multibusiness firms. Because we constructed composite industry means that were weighted averages of all of the industries in which the sampled multibusiness firms competed, we consider our variables to more accurately reflect how our sample firms competed and performed relative to industry rivals.

Sample and Data

For the sample, we identified firms in the 1989 *Fortune* 500, eliminating firms that were privately held, acquired, or taken private during the time period of the study. Complete data were available for 160 firms. Although samples drawn from the *Fortune* 500 are certainly not representative of the entire population of business enterprises, these firms do account for very large shares of total business activity and the total population of diversified U.S.-based firms. Throughout the 1980s, the sales revenues of *Fortune* 500 firms accounted for over 40 percent of the total U.S. gross national product (Abelson & Jacob, 1989). As a result, an interest in the factors influencing the strategic decisions and performance outcomes of these large firms is certainly warranted.

We gathered all data from the COMPUSTAT database, thus insuring that industry, company, and business-unit data were comparable (Davis & Duhaime, 1992). COMPUSTAT, which is compiled by Standard & Poor's and includes accounting and financial data for over 6,000 public corporations that have their shares traded on the New York, American, NASDAQ, and over-the-counter (OTC) stock exchanges, provides aggregate data for nearly 300 industries defined by four-digit SIC code. We realize that industry is an elusive concept and that any definition is likely to have both advantages and limitations. Defining industry by four-digit SIC code does, however, avoid the pitfalls of defining industries more broadly. For the research questions raised in this study, a more narrow definition of industry provided a more conservative test of predictions than a broader definition.

The COMPUSTAT database also includes financial data on firms' business units as required by the Financial Accounting Standards Board (FASB). FASB's statement number 14, "Financial Reporting for Segments of a Business Enterprise," requires firms to report financial data on the operations of any distinct business units that represent 10 percent of the firms' overall sales revenues, operating incomes, or total assets. The 160 firms in our sample reported results for an average of approximately 750 business units during the period of this study. Standard & Poor's assigns primary and secondary four-digit SIC codes to each business unit, eliminating the arbitrariness that might be associated with researchers assigning business units to

industries for comparison purposes (for an assessment of the accuracy of these SIC code assignments, see Davis and Duhaime [1992: 512–513]).

In their evaluation of various archival data sources, Davis and Duhaime (1992) concluded that the COMPUSTAT database was a very useful but underexploited source of archival financial data for studying business and corporate strategies as well as for conducting industry analyses. Though not offering as many variables as the Profit Impact of Market Strategies (PIMS) database, COMPUSTAT does include data on a larger and more comprehensive set of firms, and by offering data for every year since 1978, it is more complete than the TRINET database. Furthermore, COMPUSTAT has the additional advantage of offering comparable data at the business, firm, and industry levels that are of interest in this study.

RESULTS

Table 1 shows summary statistics and correlations among the variables. To test the hypothesized relationships in our path-analytic framework, we employed LISREL (Anderson & Gerbing, 1988; Jöreskog & Sörbom, 1986). LISREL provides a chi-square value and three additional indices that assess the fit of path models, the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), and the confirmatory fit index (CFI). LISREL also analyzes hypothesized relationships, calculating parameter estimates and standard errors that can be used to test statistical significance.

Working with observed, single-indicator variables, we proceeded to model testing directly (Bolen, 1989). The first model that was tested examined all of our study's hypothesized relationships, and the LISREL analysis of this first model produced a nonsignificant chi-square of 2.12 ($df = 4$, $p = .71$). In addition to this chi-square value, the various goodness-of-fit indices also suggested a very good fit (GFI = .99, AGFI = .98, CFI = 1.00). The analysis also provided support for four of the study's six hypotheses. Figure 2 reports parameter estimates from the analysis of this model, and Table 2 summarizes additional results of this analysis.

TABLE 1
Means, Standard Deviations, and Correlations

Variable	Mean	Standard Deviation	1	2	3	4
1. Average industry return on assets	.06	.03				
2. Diversification	.65	.47	−.26***			
3. R&D expenditures	.00	.02	.05	−.23**		
4. Capital investment	−.00	.03	.13	−.16*	.42***	
5. Effectiveness	.01	.04	.03	−.07	.21	.30***

* $p < .05$
** $p < .01$
*** $p < .001$

FIGURE 2
Path Analysis Results[a]
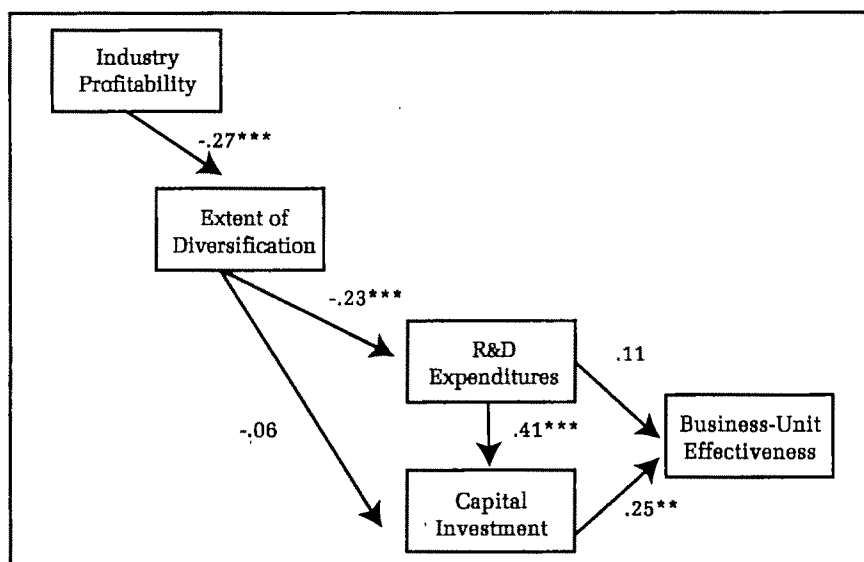
[a] Standardized estimates of the path coefficients are shown.
  * $p < .05$
 ** $p < .01$
*** $p < .001$

Using the theory-trimming techniques suggested by James, Mulaik, and Brett (1982), we reanalyzed our model after removing the hypothesized relationships that were not statistically significant in the first analysis. Subsequent analysis of this revised model and its associated goodness-of-fit statistics again suggested an excellent fit ($\chi^2 = 4.43$, $df = 6$, $p = .62$; GFI = .99, AGFI = .97, CFI = 1.00).

TABLE 2
Standardized Path Estimates

Hypothesis	Variables	Sign	b	s.e.
	Hypothesized Relationships			
1	Industry profitability *and* Diversification	−	−.27***	.07
2	Diversification *and* R&D expenditures	−	−.23**	.08
3	Diversification *and* Capital investment	−	−.06	.07
4	R&D expenditures *and* Capital investment	+	.41***	.07
5	R&D expenditures *and* Business-unit effectiveness	+	.11	.09
6	Capital expenditures *and* Business-unit effectiveness	+	.25**	.08

  * $p < .05$
 ** $p < .01$
*** $p < .001$

The results provide strong support for our path-analytic model. Supporting Hypothesis 1, industry profitability exerts a strong, negative influence on the extent of diversification. The managers of firms operating in profitable industries may have many profitable opportunities to grow within these markets, but participation in less profitable industries prompts firms to diversify into other markets. This empirical finding supports arguments made by Penrose (1959) and Teece (1982) about the timing of firms' diversification decisions, as well as the "escape hypothesis" proposed by Rumelt (1974) and Christensen and Montgomery (1981).

The results also confirm our arguments for the need to empirically examine the indirect effects of diversification on firm performance. Confirming Hypothesis 2, the results suggest that higher levels of diversification are associated with significantly lower levels of R&D expense. Though the results suggest a negative relationship between diversification and capital investment (as proposed by Hypothesis 3), this link is not statistically significant. The strong, positive influence of R&D spending on capital investment (confirming Hypothesis 4) does suggest, however, that diversification has an indirect, negative influence on capital expenditures. Analyses also found that higher levels of capital investment are associated with higher levels of business-unit effectiveness, thus supporting Hypothesis 6.

Overall, the results provide very strong support for the study's path-analytic framework, according to which diversification indirectly influences performance outcomes by influencing strategic decision making at the business level. Our framework specifically implies that diversified firms may suffer lower levels of performance because they fail to make strategic investments in the development and implementation of new product and process technologies that increase business-unit effectiveness.

To offer additional support for the hypothesized indirect influence of diversification on business-unit effectiveness, as well as to test for the existence of any possible direct effects of diversification on business-unit effectiveness, we also analyzed a third model. This third model included the hypothesized indirect effects illustrated in Figure 1 but also included a direct effect of diversification on business-unit effectiveness. This model produced a good fit ($\chi^2 = 2.11$, $df = 3$, $p = .55$, GFI = .99, AGFI = .97, CFI = 1.00), but the direct effect of diversification on business-unit effectiveness was not statistically significant.

DISCUSSION

Limitations and Methodological Issues

Before discussing the contributions and implications of the study's findings, we must acknowledge its limitations. We have already described both the strengths and the shortcomings of our data and variables. Though we tried to refine and improve on past operational definitions, many of the measures still relied on SIC classifications of industries that may not reflect managers' understandings of industry boundaries. Similarly, though our di-

versification measure has been widely used in past studies, it is computed from SIC codes and sales data. Both we and other researchers (Nayyar, 1992; Prahalad & Bettis, 1986; Stimpert & Duhaime, 1997) have argued that diversification measures computed from archival SIC and accounting data may not adequately assess managers' perceptions of relatedness.

Furthermore, many of the variables in the study are difference scores, a type of computation that raises potential methodological issues. Edwards (1993) and others have described the methodological problems that can be associated with difference scores—measures created by subtracting one value from another. Expressed most plainly, the major concern with difference scores is that a researcher finding a significant relationship between a difference score and another variable cannot be sure which component of the difference score is driving the relationship.

To address this concern, we performed two additional sets of analyses to examine the impact that our differencing methods might be having on our study's results. The first test involved reanalyzing our data using unadjusted variables (i.e., R&D expense, capital investment, and operating margin rather than R&D expense, capital investment, and operating margin adjusted for industry membership). In these additional analyses, all of our study's original results were supported.

Second, using regression analysis, we focused specifically on how the separate components of our difference scores influenced other variables in our model. We first examined the hypothesized positive relationship between R&D spending and capital investment, and we then examined the hypothesized positive relationship between capital investment and our effectiveness measure. Results of these analyses indicated a positive relationship between R&D spending and capital investment and a negative relationship between industry R&D spending and capital investment. Also, we found a very highly significant and positive relationship between capital investment and margin and a positive but nonsignificant relationship between industry capital investment and margin. Thus, we were able to conclude that business-level rather than industry-level effects were the source of the support found for our hypothesized relationships.

Our own additional analyses and the work of Edwards and others suggest at least two recommendations for future strategy research. First, instead of using difference scores, strategy researchers might consider adopting the approach suggested by Edwards, which is to include both components of the difference score (e.g., a business- or firm-level variable and the industry-level variable) and an interaction term in their analyses.

Another recommendation suggested by our additional analyses is for strategic management researchers to question the customary use of difference scores. Because spending on R&D and capital investment differs widely across industries, strategy researchers have assumed that they should control for these industry differences by using difference scores (Dess et al., 1990). Our own additional analyses suggested, however, that absolute business- or firm-level values, and not industry-adjusted measures, actually influenced

outcomes. Our additional analyses suggested that absolute business- or firm-level spending on R&D may be more important and of greater interest than R&D spending adjusted for industry R&D spending. For example, a business could spend more than the industry average on R&D and look very impressive if its spending were assessed by a difference score. Yet the R&D spending of this business might be very low in absolute terms—too low, in fact, to have any significant impact on the effectiveness of the business.

Contributions

In addition to its methodological limitations and contributions, our study offers a number of significant theoretical insights. The most important contribution of this research is its empirical demonstration of how diversification strategy indirectly influences performance. The study suggests that greater diversity can lead to lower levels of R&D spending, which can lead to lower levels of capital investment. The study suggests that if unchecked, this scenario can reduce business-unit effectiveness. These results also suggest why extensive study has so far failed to find a definitive relationship between diversification and performance: The relationship between diversification strategy and performance outcomes is complex, and most empirical studies that have examined this relationship in the past have not employed models that assess the complex interactions between industry, diversification, business strategies, and performance (Dess et al., 1995; Hoskisson & Hitt, 1990: 499). We suggest, however, that the research framework offered in this article goes a long way toward providing a more complete picture of how industry characteristics, diversification, business strategy, and performance are related. Here, we offer a number of additional observations about our study's findings that we deem noteworthy.

Industry influences. First, this study provides empirical confirmation of the long-standing hypothesis that industry profitability is an important influence on firms' diversification decisions. The study finds that firms operating in less profitable industries are likely to become more diversified. Firms operating in such industries may conclude that they have no choice but to diversify, and such a strategy would seem difficult to criticize.

One of the article's reviewers reminded us that the study by Bettis and Hall (1982) determined that Rumelt's original (1974) findings may have been biased by the presence of pharmaceutical firms in his sample. This reviewer questioned whether our findings might also be influenced by industry membership, specifically, whether our results would differ for more and less capital-intensive industries. To address this issue, we calculated a fixed-to-total-assets ratio for the firms in our sample to distinguish between more and less capital-intensive firms. We found that the mean fixed-to-total-assets ratio for the firms in our sample was .51. We then split our sample firms into two subsamples, one composed of firms with fixed-to-total-assets ratios above the mean and the other composed of firms with fixed-to-total-assets ratios below the mean, and analyzed the data for each subsample.

The results of these analyses were interesting in two respects. First, all

the relationships supported by analyses of our complete sample were also supported in the analyses of the two subsamples, allowing us to conclude that our findings were generalizable across the population of the largest industrial firms. At the same time, however, the relationships were stronger in the subsample of less capital-intensive firms, those with fixed-to-total-assets ratios below the mean. This finding suggests that an interesting avenue for future investigation would be to study how more and less capital-intensive firms differ, especially in terms of the factors that influence decisions about R&D and capital investment.

The factors influencing performance outcomes. Schmalensee (1985), Wernerfelt and Montgomery (1988), Rumelt (1991), and McGahan and Porter (1996) all examined the relative influence of industry membership, diversification (or corporate effects), and business strategy on business-unit performance outcomes. The more recent studies by Rumelt (1991) and McGahan and Porter (1996) demonstrated that much of the variance in overall performance levels could be traced to business-level effects and that industry membership and corporate parentage had significantly less impact on performance outcomes.

The current study's results provide additional support for a strong relationship between business-unit strategy and effectiveness, but the study also suggests that researchers cannot consider industry membership, diversification, and business strategy influences on performance in isolation without also considering how these factors are interrelated. Our findings suggest that performance is more likely to be a function of relationships among factors found at multiple levels of analysis and less likely to be a function of any single influence or set of influences.

Indeed, by considering how factors at various levels of analysis are interrelated, this study helps to reconcile some of the conflicting results of previous diversification studies. As already noted, a number of studies have found that firms pursuing related diversification strategies enjoy higher performance than firms pursuing unrelated diversification strategies. Yet other researchers have demonstrated that many widely diversified firms are very successful.

Instead of focusing on the direct relationship between diversification strategy and performance, our study suggests the importance of embracing a third perspective: that diversification influences performance indirectly by influencing strategic decision making at the business level. Such a perspective could go a long way toward explaining inconsistencies in studies examining the relationship between diversification strategy and performance and the failure of any study to demonstrate that diversification strategy is a major direct influence (either positive or negative) on performance (Prahalad & Bettis, 1986). This perspective is also consistent with the conclusion of Dundas and Richardson (1982) that successful diversified firms employ "critical contingencies," including policies governing acquisition, divestment, and other decisions, that contribute to successful implementation of their diversification strategies. In addition to the policies described by Dun-

das and Richardson, do these successful, highly diversified firms also defy
the trends observed in this study and spend more on R&D and invest more
in product and process technologies? Are higher levels of R&D and capital
investment key success factors for both highly diversified and less diversi-
fied firms? These are questions to be addressed by future research.

   The relationship between diversification and R&D spending. Another
important question this study raises is why higher levels of diversification
are associated with lower levels of R&D spending. As already noted, Hos-
kisson and Hitt (1988) argued that the structural characteristics of large
diversified firms contribute to a short-term, low-risk orientation among man-
agers. Such an orientation focuses more resources on sure bets than on
riskier projects with less predictable outcomes. Yet the choice of organiza-
tional structure does not offer an entirely satisfying explanation for lower
levels of R&D spending. We see little evidence suggesting, for example, that
multidivisional structures or conglomerate organizations negatively influ-
ence the levels of R&D spending and capital investment among Japanese
firms, even though nearly all diversified Japanese firms have adopted the
multidivisional structure (Suzuki, 1980). Ito (1995) suggested that Japanese
firms may cope with the challenges of managing diversification by spinning
off businesses that are incompatible with their parent firms. He reasoned that
once divorced from their parent companies, these spin-offs may be quite
effective at developing competencies and competing in their respective mar-
kets. Ito concluded that Japanese firms appear to be less interested than
Western firms in developing collections of different competencies and may
seek instead to create families of companies, each with its own R&D pro-
gram, competencies, and supporting resources.

   An important extension of our study would be a test of our model in an
international context in which the effects of both product-market and inter-
national diversification on business strategy and firm performance are con-
sidered. Such a study would not only extend the findings of our investiga-
tion, but would also help to link its findings with the studies of Grant and his
coauthors (1988), Suzuki (1980), Franko (1989), and Ito (1995), all of whom
considered many related issues in an international context.

   The role of research and development. That R&D is positively associ-
ated with a firm's level of capital investment (supporting Hypothesis 4) but
is not directly associated with business-unit effectiveness (therefore failing
to support Hypothesis 5) seems reasonable in retrospect. Research and de-
velopment is speculative; many ideas may be investigated, but only a few
become viable investment opportunities. Although R&D is clearly needed to
identify these viable investment opportunities, not all R&D activity will lead
to improvements in business-unit effectiveness. Those projects that do re-
ceive capital investment should, however, lead to improvements in effec-
tiveness. This line of reasoning raises provocative questions about the pro-
ductivity of R&D activities and how this productivity can be improved.

   Hambrick and MacMillan (1985) examined the factors that promote the
conversion of product R&D spending into near-term new product sales. They

found that a number of contextual factors, including the rate of growth in the market for a new product and firms' past experiences in innovative contexts, contribute to R&D productivity. They also found that market share and R&D productivity are inversely related. Their study and the results of our study invite further research. For example, Hambrick and MacMillan's study did not address why firms with larger market shares are less innovative, nor did it address the factors that contribute to the success of process R&D efforts.

The importance of business-unit effectiveness. Finally, this study suggests that the relationships among R&D, capital investment, and business-unit effectiveness deserve more attention from researchers and managers. The results of this study suggest that the failure to make continuous improvements in business-unit effectiveness may be at the heart of many firms' problems with competitiveness, and these concerns may be even more significant for the large diversified firms that dominate the economic landscape. Yet, in spite of this importance, few studies in the strategic management literature investigate business-unit effectiveness issues.

CONCLUSION

In conclusion, this study suggests that the sources of competitive advantage that are responsible for high performance may lie more in the complex relationships among factors found at multiple levels of analysis than in any single factor or set of factors found at only one level of analysis. This study supports the view that competitive advantage results from a series of connected decisions (Grant et al., 1988). Industry characteristics influence the selection of a particular product-market portfolio, which in turn influences the acquisition of strategic factors that result from R&D expenditures and capital investments (Barney, 1986; Dierickx & Cool, 1989).

Over time, a successful firm may decide to participate in certain market segments and then proceed to develop unique stocks of strategic assets that provide for and sustain the firm's competitive advantage in those markets. This study suggests that more extensive diversification is associated with reductions in R&D spending that in turn lead to lower levels of capital investment and business-unit effectiveness. As a consequence, diversification may thwart the process of asset stock accumulation that is associated with the development of competitive advantage and high levels of performance. A very worthwhile challenge for future research is to develop a richer explanation of how streams of decisions about industry membership, diversification, and business strategy converge and interact to influence performance outcomes.

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DISAGGREGATING THE AGENCY CONTRACT: THE EFFECTS OF MONITORING, INCENTIVE ALIGNMENT, AND TERM IN OFFICE ON AGENT DECISION MAKING

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Using a laboratory design, we examined the simple and interactive effects of monitoring and incentive alignment on managerial decisions. Length of term in office was a third independent variable. Results show that incentive alignment was a more powerful mechanism than monitoring for ensuring that agents acted in the interests of owners. An interaction of monitoring, incentive alignment, and term in office revealed that these effects are relatively complicated and deserve further study. Also, incentive alignment had a beneficial effect for the principal for long-term CEOs, even though the tendency to escalate (an effect negative for principals) was greatest for those agents.

The contract is the central, most crucial concept in agency theory because it distinguishes agency theory from classical and neoclassical economics, in which market forces act as a disciplining mechanism on the owner/entrepreneurs who actively manage firms. Agency theory recognizes the reality that in large organizations, owners may be separated from the managers who make decisions in firms, and that the two may have different interests. The theory treats firms as systems of complex written and unwritten contracts among disparate individuals (Fama & Jensen, 1983). The convention is that a firm's owners are defined as the principal, and its management, typically the chief executive officer (CEO), is defined as the agent. Both are assumed to be rational but to have divergent self-interests that each seeks to maximize. To counter this divergence, the principal seeks to control the agent through the contract, an agreement that specifies the rights of the parties, the system for monitoring the agent's actions, and the reward structure, including the degree to which managerial incentives are aligned with the interests of the owner (Fama & Jensen, 1983). It is through the contract that the decision makers are linked to the market and the interests of owners. An extensive theoretical literature (see Eisenhardt's [1989] review) and em-

pirical work (cf. Hunt, 1986) on the structure of the contract, especially optimal levels of monitoring and incentive alignment, has led to a consensus that suggests that "corporations can and should increase their control over top managers by increasing the use of managerial incentives and monitoring by the boards of directors" (Zajac & Westphal, 1994: 121).

This consensus is, we believe, premature for several reasons, and more work is necessary to understand the structure of the contract. First, the theoretical work in agency theory unnecessarily oversimplifies the complexity of the contract and skirts some serious problems about fundamental characteristics of its common elements, monitoring and incentive alignment, that are rooted in the nature of the contract. Mathematical models that carefully specify contract conditions and lead to deterministic solutions (e.g., Holmstrom, 1979) are divorced from organizational realities because of the impossibility of capturing all possible eventualities, the presence of uncertainty, lack of information, and the dynamic nature of the principal-agent relationships (e.g., Mintzberg, 1990). This has led some scholars from the management, rather than the economics, tradition to challenge the agency concept of the contract. For instance, some have viewed the contract as a metaphor, criticizing the principal-agent model's focus on the contract for ignoring the political and interpersonal aspects of principal-agent relations (Eisenhardt, 1989; Perrow, 1986). Others have tended to be skeptical about any contractual elements that mechanistically regulate the relationship between principals and agents. Putterman (1984) suggested that the agency relationship may be an authority, rather than a contractual, one, as Alchian and Demsetz (1972) viewed it. As an authority relation, it is more complex than a simple contractual relation and raises issues that fall under the purview of the organizational disciplines. Second, managerial contracts may be arranged by boards of directors that, quite often, are more influenced by their own links with a firm's managerial group than by their fiduciary responsibility to its owners (O'Reilly, Main, & Crystal, 1988; Tosi & Gomez-Mejia, 1989). Further, managers are better informed about what they do and about firms than are owners and, most likely, boards of directors. Manager's information advantage allows them to influence the contract to minimize their personal compensation risk (Tosi & Gomez-Mejia, 1989). Finally, Jensen and Murphy (1990) analyzed the compensation-performance histories of several thousand CEOs over two decades and concluded that their results were not consistent with formal agency models of optimal contracting. Elsewhere, those authors have argued that the theoretical explanations of incentive alignment and monitoring are incomplete but that a "thorough understanding of [these] processes [is] necessary for a viable theory of the firm" (Baker, Jensen, & Murphy, 1988: 615). Zajac and Westphal (1994) echoed this argument, stating that monitoring and incentive alignment might not only have different effects but might also vary in how they are used by firms.

These criticisms raise some important questions about the structure of the agency contract. First, what is the nature of the relationship between incentive alignment and monitoring systems in firms? Second, if CEOs can

influence the nature of contracts, what effect does this have on contracts over time, and how does it affect the decisions CEOs make? Third, since both incentive alignment and monitoring are different forms of control of agents by principals, what are the different effects of each form on managerial decisions, if there are any such effects?

Zajac and Westphal (1994) addressed the first question. They found that firms tended to treat incentive alignment and monitoring as substitutes and that the use of incentives was negatively related to monitoring processes. That is, firms with weak incentive alignment had more monitoring mechanisms in place, and vice versa. A question that they did not address remains: whether or not the effects of incentive alignment and monitoring differ if they are substituted for each other.

There is empirical evidence of the importance of the second question. This evidence shows that a manager's history with a firm or its board of directors may act as a contingency to affect the substance of the agency contract. These findings show (1) there are reductions in the sensitivity of pay to performance as CEO tenure, or term in office, increases (Gibbons & Murphy, 1992) and (2) there are greater effects from social influence processes on chief executive compensation than from conventional labor market forces (O'Reilly et al., 1988). If this is the case, then the question is whether or not a manager's tenure with a firm has negative effects on the interests of the equity holders when the sensitivity of pay to performance declines.

None of this research has addressed the third question, concerning possibly differential effects of incentive alignment and monitoring on agent decisions. This is an important question and is the central focus of this study. If there are trade-offs between monitoring and incentive alignment of the type Zajac and Westphal (1994) demonstrated, then it is critical to know how these two control mechanisms affect the choices of managers and further, whether or not these choices are different for managers with different histories with boards of directors.

In this study, we used a laboratory experiment to seek a more specific understanding of the agency contract by disaggregating it into its two major components, monitoring and incentive alignment, and then analyzing their simple and interactive effects on the decisions of agents with different histories as CEOs. The laboratory experiment is particularly useful for this analysis because it has some advantages over the more common methodologies used in agency theory research. Almost without exception, such research has involved firm-level econometric analyses of proxy variables created from databases such as COMPUSTAT and Compact Disclosure. Researchers have typically assessed the effects of monitoring through the use of proxy variables such as the proportion of outsiders on a board of directors (e.g., Zajac & Westphal, 1994) and the concentration of equity holdings (e.g., Gomez-Mejia, Tosi, & Hinkin, 1987; Hambrick & Finkelstein, 1994; McEachern, 1975). There are at least two problems with these studies. The first is that they require a strong assumption that these proxy variables have isomorphic behavioral counterparts. For example, it is assumed that the pres-

ence of more outside than inside board members or of a single, large equity holder will influence managers to act in the best interests of a firm's owners. The second problem is that these studies use some variation of correlational methods, limiting causal inferences in the conventional sense. These problems can be overcome in the laboratory, where researchers can construct variables of interest and manipulate them in ways that isolate their effects and permit stronger inferences about their causal effects.·

The design of the experiment reported here is a variation of the widely used escalation of commitment design developed by Staw (1976). We consider this experiment a strong test of the hypotheses because over 20 years of research using this design has demonstrated that decision makers become trapped in previous courses of action in order to justify their actions as correct and not admit to themselves or others that their prior use of resources was incorrect (Brockner, 1992), so they are likely to continue to misallocate resources (escalate commitment) as a way to justify prior poor decisions. Examining the extent to which monitoring and incentive alignment can reverse or ameliorate this escalation tendency under some conditions provides a stronger test of their effects on agent decisions. In other words, the logic behind the choice of experimental design was that if monitoring and incentive alignment can induce agents to make decisions that are favorable to principals, in spite of conditions promoting the opposite (pressure to escalate), this would provide compelling evidence that these control mechanisms do, indeed, work.

We made important changes from the original escalation design that permitted us to assess how incentive alignment and monitoring align managerial decisions with the interests of equity holders. The first change is that the experiment was recast to reflect the principal-agent relationship. The second change involved the roles subjects took. In the original study, all subjects took the role of CEO for all decisions; in this experiment, only about half of the subjects took the role of CEO throughout the complete study. The others took the role of chief financial officer for the first experimental phase and then were "promoted" to CEO for the second phase. We made this modification so that we could assess whether incentive alignment and monitoring affected escalation levels differently for subjects who were not responsible for previous poor decisions and for those subjects who were. The third change was in the structure of the decisions subjects made. In the original study, subjects could only increase or decrease the amount of the investment in one of two hypothetical company divisions (Staw, 1976). In the present study, the two divisions were split into strategic business units (SBUs), and subjects received information about the projected sales and profitability of all the organizational units to which they could allocate resources. They also received historical data on the firm's sales and profitability, and the CEO's pay.

THEORY AND HYPOTHESES

In this section, we set out the theoretical and empirical bases for five hypotheses tested in this study. The first two are straightforward hypotheses

about the simple effects of incentive alignment and of monitoring on the choices of decision makers. The third hypothesis specifies how monitoring and incentive alignment interact to affect decisions. The fourth hypothesis, which has two parts, considers how term in office affects decision making.

Simple Effects

Incentive alignment. Alignment of an agent's and a principal's interests can be achieved through contracts that make the agent's compensation contingent on outcomes of his or her performance that are desired by the principal (Baiman, 1990; McGuire, 1988; Riordan & Sappington, 1987). Incentive alignment as a control mechanism is based on the notions that "managers' utility is generally assumed to be a function of their compensation" (Groff & Wright, 1989: 7), that executive tasks are "nonprogrammable," so that financial incentives can provide an efficient form of self-regulation (Eisenhardt, 1989), and that managers prefer strategies and choices that maximize their total pay packages (Kroll, Simmons, & Wright, 1990). Accordingly, managers' decisions about capital allocations, research and development investments, new venture start-ups, acquisitions, and so forth are influenced by how these choices affect their pay, as established in their firms' compensation schemes (Gomez-Mejia et al., 1987; Halpern, 1983; Hambrick & Finkelstein, 1994; McEachern, 1975; Roll, 1987). Therefore,

> *Hypothesis 1. When an agent's incentives are aligned with the interests of a principal, the agent's decisions will be more consistent with the welfare of the principal.*

Monitoring. It has been argued that unsupervised managers are more likely to behave opportunistically (Fama, 1980; Hoskisson & Hitt, 1990). Thus, monitoring is expected to prevent managers from making decisions that have a negative impact on principals, independent of incentive alignment. Theoretically, monitoring is defined as observation of an agent's effort or outcomes that is accomplished through supervision, accounting controls, and other devices (Jensen & Meckling, 1976). Shavell (1979) and Holmstrom (1979), assuming that monitoring was costless, theoretically demonstrated that *any* monitoring will result in gains to a principal except when the actions of an agent can have no negative effects on the principal's outcomes. Therefore,

> *Hypothesis 2. When principals acquire information through monitoring key decisions that affect their welfare, agents' decisions are more consistent with the welfare of the principals.*

The Interaction of Monitoring and Incentive Alignment

Milgrom and Roberts (1992) outlined the theoretical conditions under which monitoring and incentive alignment can be either substitutes or complements. The two variables act as substitutes if either managerial effort or the outcomes of managerial effort can be accurately assessed. When effort

can be accurately measured, monitoring will result in outcomes desired by a principal. When outcomes are accurately measured, the compensation of an agent can be designed in ways that align the agent's and the principal's interests. Monitoring and alignment instead act as complements when there is error in measuring either the agent's behavior or the outcomes, and the principal chooses both monitoring and incentive alignment because "undertaking either activity makes the other more [effective]" (Milgrom & Roberts, 1992: 227). In this case, as we noted earlier, any monitoring or incentive alignment is likely to result in benefits to the principal (Holmstrom, 1979; Shavell, 1979).

For a number of reasons, we expected incentive alignment and monitoring to have complementary effects on agents' performance. First, any information principals obtain about agents' behavior is subject to uncertainty and noise resulting from the monitors' subjective assessments or bounded rationality. Further, executives' task programmability is low, and their discretion and the knowledge requirements of their positions are both high. Second, even if compensation is linked to outcomes important to principals, agents may deceive them by taking advantage of unavoidable information asymmetries. For instance, agents may choose accounting methods that state results in ways more favorable to themselves than to stockholders (e.g., Groff & Wright, 1989; Holthausen & Leftwich, 1983; Hunt, 1986); become more risk averse in their decision making than principals would prefer as they (the agents) assume greater pay risk (Ahimud & Lev, 1981; Beatty & Zajac, 1994; Kroll et al., 1990; Walsh & Seward, 1990); or reduce capital expenditures and research and development to improve profitability figures at the expense of long-term performance (Hill & Snell, 1989). Therefore, increased monitoring is likely to curb such problems even under conditions of high incentive alignment (Milgrom & Roberts, 1992). Thus,

> *Hypothesis 3. Monitoring and incentive alignment have a complementary association such that when both are present, the effect is stronger than the sum of the individual effects.*

The Effects of Agent Term in Office

As we noted above, a manager's tenure with a firm may moderate the effects of monitoring and incentive alignment, as has been shown by both theoretical demonstration (Cyert & Praveen, 1992) and empirical evidence (Gibbons & Murphy, 1992; Hill & Phan, 1991; Murphy, 1986) that the sensitivity of pay to performance decreases as CEO tenure increases. There is also evidence that CEO tenure is negatively correlated with board influence over CEO pay, compensation risk, and monitoring of the compensation process itself (Tosi & Gomez-Mejia, 1989).

There are two conflicting explanations for the increased decoupling of

pay and performance as CEO tenure increases. One, a learning argument, is that as a principal's familiarity with an agent increases, monitoring and the linking of pay to desired outcomes is unnecessary (Murphy, 1986). Monitoring is less informative because the principal has developed an accurate picture of the agent's ability and performance contributions so that the value of incremental information about the agent, either in the form of observed outcomes or direct supervision, decreases over time. This reduction in the information value of monitoring could occur because, as principals have more experience with agents, they are better able to differentiate between unfortunate exogenous circumstances and mismanagement when they evaluate and reward the agents (Eaton & Rosen, 1983).

A second explanation, based on the concept of managerial entrenchment, is that over time CEOs can manage their relationships with boards in ways that reduce CEOs' compensation risk (cf. Walsh & Seward, 1990). CEOs control board appointments, which are lucrative, prestigious, and highly sought; after board members are appointed, they may be reluctant to engage in strong efforts to control managers either because they fear that they themselves will be replaced or because reciprocity norms are operating (O'Reilly et al., 1998). Using such logic, Cyert and Praveen demonstrated that pay sensitivity decreased with tenure and then argued that this decline was due to ex post bargaining with boards and not to the "ex ante contracting which is the basis of the agency model" (1994: 3).

Both the learning and the entrenchment explanation are post hoc interpretations that are consistent with the empirical facts that pay and performance are gradually decoupled as a CEO's term of office grows longer (Gibbons & Murphy, 1992; Hill & Phan, 1991; Murphy, 1986), but they suggest very different outcomes for principals. The learning explanation suggests that principals over time can, in the absence of controls, trust agents to continue to act in the principals' interests. The entrenchment explanation suggests that over time, in the absence of controls, agents can take advantage of principals, making decisions that are in their own interests. However, these are inferences about agents' actions, not empirically verified conclusions.

However, some theoretical and empirical bases for concern about pay's reduced sensitivity to performance as tenure increases can be found in the escalation of commitment literature. Research on such escalation has shown that individuals become locked into failing courses of action and increase their commitment to them (Brockner, 1992; Staw & Ross, 1977). This occurs when three conditions are present: (1) there are costs or losses from previous actions, (2) these have occurred over an extensive period of time, and (3) simple withdrawal is not an obvious strategy for the decision maker (Staw & Ross, 1977). These conditions are likely to exist when CEOs have made decisions and were responsible for committing resources to projects that did not work out well and would therefore, according to escalation theory, continue investments in those projects, especially absent control by a principal.

We expected to observe such a negative effect on principals' interests in this study. Thus,

> *Hypothesis 4a. The decisions of short-term agents will be more consistent with the welfare of principals than those of long-term agents.*

Supported, Hypothesis 4a would lead to the question of whether incentive alignment and monitoring might mitigate the continuing effects of prior decisions that negatively affect principals. The prediction based on the entrenchment hypothesis is that high monitoring and incentive alignment will lead to decisions more aligned with principals' interests (i.e., reverse the escalation). The following hypothesis addresses this issue, assessing whether or not managers with lengthy tenure make decisions more favorable to principals under conditions of tighter or weaker control by the principals. Therefore,

> *Hypothesis 4b. The decisions of long-term agents will be more consistent with the welfare of principals under conditions of high monitoring and high incentive alignment than under conditions of low monitoring and low incentive alignment.*

METHODS

A pilot study was conducted using 84 subjects, who did not participate in the final study, to assess the degree to which the experimental manipulations produced the intended states in the subjects. Drawing on this pretest, we made revisions to improve understanding of the scenarios, clarify the tasks that the subjects were asked to perform, and fine-tune the experimental protocols. Enhancements of the manipulations for monitoring and incentive alignment were also based on the results of the pilot study and the debriefing of its subjects. The final experiment, which includes all the modifications suggested in the pilot study, is described below.

Subjects and Scenario

Subjects were 228 undergraduate students from a major university in the southeastern United States enrolled in the school's introductory management course, in which issues of the type treated in the experiment were major topics. These students represented a variety of college majors, although well over 50 percent had business administration majors. Subjects earned extra course credit and were paid $5 for their participation in the experiment. They were randomly assigned to each of the experimental conditions involving monitoring, incentive alignment, and term of office.

We modified Staw's (1976) original experimental case study scenario by introducing conditions to simulate the principal-agent relationship between a firm's CEO and its board of directors. Subjects were told the experiment was a strategic decision-making problem similar to those discussed in the

course. The case describes Adams and Smith, Inc., a large manufacturing firm, presenting its financial history over a ten-year period. According to the case, the profitability of the company has declined in recent years, and the directors of the company have agreed that one of the causes for the decline is the company's failure to invest in research and development (R&D) efforts.

Subjects, as in Staw's (1976) original study, were first presented with a decision, made by the firm's CEO (P. Johnson) and approved by the board, to invest $10 million in research and development in one of the company's two divisions, Industrial Products or Consumer Products. Then subjects received feedback that the decision resulted in negative effects—that Adams and Smith continued to experience losses and flat sales.

At this point in the experiment, subjects were informed that the board had made two strategic decisions. The first was that there was to be a re-structuring of Adams and Smith, as follows:

> . . . The Corporate Restructuring Committee was created by the Board from its members, along with a group of very competent consultants. The Corporate Restructuring Committee recom-mended, and the Board approved, a reorganization of Adams and Smith which creates product groups within each of the di-visions.

Subjects were then provided with forecasts of the operating profits and sales for all of the strategic business units (SBUs). These forecasts showed that the division in which the CEO had previously invested would experience nei-ther profit nor sales growth, but that the two SBUs newly formed from the division previously *not* chosen for investment would experience *either* rapid sales *or* profit growth, but not both. The second board decision was that the board wished to continue investing in all SBUs and, despite the negative results from the previous years, would increase the level of investment from $10 million to $20 million. The subjects were to decide how much of the $20 million to invest in these different units, facing the alternatives of invest-ment in the previous choice that produced poor results or of allocating the funds to other projects that had different rates of growth and rates of return.

Variables

Dependent variables. There were two dependent variables. The first, used for all tests of hypotheses, was level of investment in the newly created SBUs, whose profit growth was predicted to be the result of the research and development expenditure. This was the "profit-maximizing strategy." The second, used to test Hypothesis 4a, was the investment in the previously poor choices that were made in the earlier periods, the "escalation-level" decision.

Independent variables. The *incentive-alignment* conditions associated CEO pay with either a profit-maximizing strategy, the alternative more ad-vantageous to the principal (company stockholders), or with a sales-growth strategy, which was less advantageous to the principal. Subjects were pro-

vided with background financial information that included firm sales and profits over the past ten years and the compensation history of the CEO over that period. For subjects in the high-incentive-alignment condition, this history showed the CEO's pay was linearly related to the firm's profit performance. In the low-incentive-alignment condition, the history showed the CEO's compensation was linearly related to the firm's sales rather than to its profits. These conditions were designed so that there was no compensation risk for the CEO. Subjects taking the role of CEO could maximize their pay because, knowing the pay history, they could choose the strategy that was linked to CEO pay. The important distinction is that for each subject, one of these alternatives produced higher returns to both the firm's owners and managers (i.e., profits) and the other produced higher returns to only the managers (i.e., sales). Further, as a result of the pilot study, the incentive alignment treatment was strengthened with the addition of bonus points, which were traded for cash-prize-drawing tickets if the subjects' decisions were consistent with the compensation scheme described in their specific scenario. The first prize was $250, the second prize was $150, and ten third prizes were $10 each. Subjects indicated their level of agreement to two Likert-type manipulation check items (high agreement = 1, low agreement = 5) that suggested that the treatment was effective. The items and means for the incentive alignment conditions were: "The CEO's compensation was affected by firm sales" ($\bar{x}_{low\ incentive\ alignment}$ = 1.53, $\bar{x}_{high\ incentive\ alignment}$ = 3.04; $p < .0001$) and "The CEO's compensation was affected by firm profits" ($\bar{x}_{high\ incentive\ alignment}$ = 1.35, $\bar{x}_{low\ incentive\ alignment}$ = 2.54; $p < .0001$). Debriefings after the experiment indicated that the bonus points and cash prizes enhanced involvement in the experiment. Subjects reported being torn between acting opportunistically and acting in the best interests of "their company."

Monitoring was simulated by varying the level and the nature of the board of directors' control over the strategic choices of the CEO and, further, by varying the actions of the experiment's administrator during the experiment itself. In the high-monitoring condition, subjects were informed that there would be (1) additional strategic controls because the board of directors would be requesting more written reports and meeting more frequently to evaluate the strategic desirability of the CEO's decisions before they were implemented (Baysinger & Hoskisson, 1990), (2) more active and direct observation of the activities of the CEO ("The board will be watching your decisions closely . . . through direct board oversight"), and (3) an internal auditor reporting to the board about the outcome of decisions. In addition, because of the pilot study results, we strengthened the monitoring treatment by increasing the role of the experiment's administrator to reinforce the notion that the subjects' decisions were being closely monitored. The subjects in the high-monitoring condition were thus required to prepare written justifications for their decisions. The administrator read each justification, asked each subject if he or she was sure of the decisions, and then made a notation that the justification had been reviewed and approved. In

the low-monitoring condition, subjects were told that the board was composed of six long-term members who "were very honored to serve on a prestigious board. . . [and] indicated a high level of trust and confidence in [the CEO's] ability to serve as the CEO [or new CEO]. Clearly [the CEO is] empowered to run the company as [he or she] sees fit." The subjects were also told that they had "significant latitude" in their decision making. Two manipulation check items indicated that the modified monitoring treatment took: "I felt my decisions were monitored very carefully" ($\bar{x}_{high\ monitoring}$ = 1.75, $\bar{x}_{low\ monitoring}$ = 2.38; $p < .0001$) and "I felt secure in my job as CEO" ($\bar{x}_{high\ monitoring}$ = 2.63, $\bar{x}_{low\ monitoring}$ = 2.11, $p < .0001$).

The monitoring treatment was purposefully designed without explicit sanctions such as firing, demotion, or pay reduction so as not to confound its observational properties with its punitive potential. There is no evidence that such negative sanctions are explicit in most contracts. Qualitative studies of boards suggest that they exercise intermittent, somewhat passive, general supervision over top management, not very different from the monitoring in our experiment, as opposed to more active, direct, concurrent control of managerial decisions (Lorsch & MacIver, 1989). Further, as Stearns and Mizruchi (1993) noted, it is the threat of action rather than explicit sanctions that may influence agent behavior under conditions of high monitoring. In the context of the experiment, subjects received extra credit if they successfully completed the task; under close monitoring, the unspecified threat was present that failure to do so would be more easily noted and thus could have negative consequences (i.e., forfeiting the extra credit). In addition, although sanctions were not explicit in the monitoring treatment, the manipulation checks confirmed that subjects were able to discern the extent to which they were being monitored and did feel torn between maximizing their own interests and those of the equity holders. Finally, we did not link the monitoring to explicit rewards (e.g., prize points) so as to more sharply differentiate it from incentive alignment.

The *term of office* treatment was created by assigning subjects to either a long-term-CEO or a short-term-CEO condition. The essential difference between the conditions was the assignment of responsibility for prior decisions. Those in the long-term condition were in the role of P. Johnson, the CEO of Adams and Smith, throughout the complete experiment and were told that they had made the earlier, poor research and development investment decisions. Subjects in the short-term condition began the experiment as the chief financial officer of Adams and Smith, an important member of the management team that made the first investment decision. However, they were also informed that "the board designated the CEO, P. Johnson, to decide which division to invest in. . . . As a result of the board decision to increase R&D expenditures, the CEO P. Johnson, given the information contained in the case and the knowledge of actual economic conditions during the relevant time period, was asked to determine which of the two divisions should receive the [additional funds] . . . P. Johnson chose the XXX Division." After that first decision had been made, they were informed that (1)

the results were negative, (2) P. Johnson had retired, and (3) the chief financial officer had been appointed the new CEO by the board and would be responsible for any subsequent investment decisions.

RESULTS

Table 1 reports the mean values for each of the main effects (monitoring, incentive alignment, and term in office) on the various investment decisions. Table 2 reports the mean values of the profit-maximizing strategy investment decision for each level of monitoring, incentive alignment, and term in office. Table 3 reports the results of the analysis of variance to test the simple and interactive effects of monitoring, incentive alignment, and term in office for the profit-maximizing strategy. Since the profit-maximizing strategy and sales-growth strategy decisions were exact reflections, only the profit-maximizing strategy is reported here.

Hypothesis 1, predicting greater investment in the profit-maximizing alternative in the high-incentive-alignment condition, was supported (Tables 1 and 3; $F = 85.74$, $p < .01$). Contrary to Hypothesis 2, high monitoring did not result in more profit-maximizing investments than low monitoring (Tables 1 and 3, $F = 2.62$, n.s.). Further, there were no significant two-way interactive effects of monitoring and incentive alignment on the

TABLE 1
Mean Values of Monitoring, Incentive Alignment, and Term in Office for Investment Decisions[a]

Independent Variables[b]	Dependent Variables
Profit-maximizing strategy	
Monitoring	
High	$10.50 (117)
Low	$11.50 (111)
Incentive alignment	
High	$13.88 (111)**
Low	$ 8.24 (117)
Term in office	
Long	$10.40 (116)*
Short	$11.59 (112)
Study mean	$10.99 (228)
Escalation of previous decision	
Term in office	
Long	$ 3.17 (116)*
Short	$ 2.16 (112)
Study mean	$ 2.68 (228)

[a] Means are in millions of dollars; Ns are in parentheses.
[b] Significance of differences between high and low conditions are shown for each independent variable.
* $p \le .05$
** $p \le .01$

TABLE 2
Mean Profit-Maximizing Investments by Experimental Conditions[a]

Term as CEO	High Incentive Alignment		Low Incentive Alignment	
	High Monitoring	Low Monitoring	High Monitoring	Low Monitoring
Long	$11.68 (30)	$14.85 (27)	$8.03 (30)	$ 7.38 (27)
Short	$15.24 (27)	$13.98 (27)	$7.53 (30)	$10.13 (28)

[a] Means are in millions of dollars; *N*s are in parentheses.

profit-maximizing strategy, so findings failed to support Hypothesis 3 (Table 3; $F = .002$, n.s.).

Hypothesis 4a was supported; there was a main effect of term in office ($F = 4.10$, $p < .04$). Subjects in the long-term-CEO condition made lower mean investments in the profit-maximizing alternative ($10.4 million) than the new CEOs ($11.59 million) (Tables 2 and 3) and invested at higher levels in the previous strategy that produced poor results ($F = 5.63$, $p < .05$; Tables 1 and 3). Since Hypothesis 4b was stated as an a priori comparison of specific experimental conditions, we assessed the difference between the conditions with a standard *t*-test. Hypothesis 4b, testing the effects of stronger agent controls on subjects, was supported. Subjects in the long-term CEO condition and in the high-monitoring/high-incentive-alignment conditions made significantly greater investments in the profit-maximizing strategy ($11.68 million) than long-term subjects in the low-monitoring/low-incentive-alignment conditions ($7.38 million; $t = 3.50$, $p < .001$).

DISCUSSION

The effects of incentive alignment and monitoring may not be as straightforward as agency theory suggests. On the one hand, the main effects

TABLE 3
Results of Analysis of Variance of the Effects on Profit-Maximizing Decisions

Source of Variance	Mean Square	df	F	p
Monitoring	55.44	1	2.62	.10
Incentive alignment	1817	1	85.74	.01**
Term in office	86.91	1	4.10	.04*
Monitoring × incentive alignment	0.04	1	0.00	.97
Monitoring × term	3.34	1	0.16	.69
Incentive alignment × term	1.48	1	0.07	.79
Monitoring × incentive alignment × term	209.7	1	9.89	.01**
Explained variance	309.7	7	14.61	.01**
Residual variance	21.20	220		
Total variance	30.09	227		

* $p \leq .05$
** $p \leq .01$

of incentive alignment are consistent with theory: When a compensation structure is aligned with the interests of owners, managers make profit-maximizing decisions; but when compensation is linked to decisions with lower returns to owners, managers will choose those decisions (Hypothesis 1). On the other hand, high levels of monitoring did not increase the agents' investment in the strategic profit-maximizing decisions (Hypothesis 2), in spite of the active monitoring role of the experiment administrator and the experimental induction emphasizing the board's desire to improve firm performance through increased observation of the subjects' actions.

The practical implication of these findings is that equity holders may find incentive alignment more effective than monitoring to ensure that agents act in their interests. Although the design of such a compensation system is obviously complicated, the more serious problem could be its implementation, which depends upon the power of a board relative to that of a chief executive. When managers, particularly CEOs, are more influential than stockholders, the process of designing the managerial compensation package is influenced most strongly by internal political processes, which are controlled by the managers themselves (O'Reilly et al., 1988; Tosi & Gomez-Mejia, 1989).

The relationship of monitoring and incentive alignment appears to be more complex than the complementarity or substitutability articulated in agency theory (Hypothesis 3). The high-monitoring treatment did not, as we expected it would, redirect the choices of subjects in the low-incentive-alignment condition toward the profit-maximizing strategy and away from the sales-maximizing strategy (Hypothesis 3). Our results, coupled with the findings of Zajac and Westphal (1994) showing that firms substitute monitoring for incentive alignment, imply that substituting monitoring for incentive alignment could lead to outcomes less beneficial to principals.

Thus, given the importance of the role of monitoring in agency theory and its widespread use as a managerial control mechanism, it is necessary to know more about whether and under what conditions more intense monitoring, as differentiated from incentive alignment, will produce results consistent with the theory at any level. It is difficult to assess this from archival studies because of the sorts of measures that have typically been used (i.e., the proportion of inside to outside directors). Such proxy measures indicate that there are potential monitors present but do not provide any direct evidence of whether or not this presence results in greater monitoring. It would also be of considerable interest to know the answer to the question, "How much monitoring is equal to how much incentive alignment?" Drawing from theory to create the independent variables in this study, we assumed that they would have the theoretical effects predicted—that they would have relatively similar effects on agent decisions. Yet these data suggest very different effects, and knowing more about this difference would be of significant importance both theoretically and empirically.

The results also provide empirical evidence about the effects of decreased sensitivity of pay to performance for long-tenured CEOs that is not

available from the extant literature and, taken with the results of work that focuses on similar issues, raise some interesting questions. First, we take as given the premises that (1) pay's sensitivity to performance declines as a function of CEO tenure (Cyert & Praveen, 1994; Gibbons & Murphy, 1992; Hill & Phan, 1991; Murphy, 1986; Tosi & Gomez-Mejia, 1989) and (2) as pay sensitivity declines, there will be corresponding increases in other monitoring mechanisms, such as the number of outside directors (Zajac & Westphal, 1994). These premises suggest that at the same time that the compensation risk of a CEO is being reduced because pay is less closely coupled with firm performance, it is likely that he or she will have had the opportunity to strengthen interpersonal relationships with the board (O'Reilly et al., 1988). If this is the way that the phenomenon occurs, our results indicate that principals will be negatively affected because of the tendency for long-term agents to invest at lower levels in principal-beneficial outcomes, a tendency reflected in lower investments in profit-maximizing strategies and higher levels of investment in previously poor choices (Hypothesis 4a). Thus, the implication is that the past investment histories of long-term agents carry into their future decisions. When previous decisions have not produced desirable results, the managers who are responsible for them appear to retain residual preferences for their previous choices.

However, our design decision was to "promote from within" and to differentiate the responsibility for previous decisions in the experiment itself. Thus, there is a possibility that an internal successor might have a sense of some residual, but indirect, responsibility for the previous decisions because he or she was a member of the management team. Future research might address this issue by focusing on comparing how incentive alignment and monitoring affect a CEO who comes from outside a firm to the sorts of effects we found here for continuing CEOs.

Hypothesis 4b examines different ways principals can seek to remedy the effects of decreased pay sensitivity. One possibility is to subject agents to stronger controls. Tests of the hypothesis show that stronger controls have positive effects. In the high-incentive-alignment/high-monitoring conditions, the decisions of subjects who took the role of long-term CEO were more consistent with the principal's interests; they invested at higher levels in the profit-maximizing strategy than long-term CEOs in the weak-control condition (Hypothesis 4b). Incidentally, these results cast suspicion on the learning explanation for weaker sensitivity of pay to performance and on stewardship theory, both of which advocate weaker control by boards as an effective approach to corporate governance (Donaldson & Davis, 1991). If they were good explanations, we would have found no beneficial effects of control mechanisms for long-term agents who were more prone to escalate.

We wish to add a footnote about our methodological choice for this research. Laboratory experiments can usefully complement the currently dominant use of archival economic and demographic data. We have already noted the major problem with archival approaches that use financial or demographic proxy variables at the firm level as the bases for behavioral and

motivational inferences about individuals within the "black box" of the firm (Jensen & Murphy, 1988). In a laboratory experiment, it is possible to study these individual and organizational processes more directly, by creating conditions that are specified in the theory and manipulating them. Experiments force, a priori, a precise articulation of the particular form and level of agency variables. The obvious problem is that the laboratory is an artificial setting in which the subjects may not represent those to whom the results are intended to generalize and in which the variables are isolated from the ordinary situations in which they normally occur. We sought to deal with these issues by designing the experiment to capture the essence of the relevant theoretical concepts and to provide sufficient motivation for the subjects that was consistent with the theory. The pilot study, the manipulation check, and subject debriefings indicated that the treatments took. Thus, if the experiment did capture the essence of the model, the use of student subjects should not be problematic because of the agency theory assumption that all people are self-interested and, given the opportunity and incentives, will act on their interests (Kosnik & Bettenhausen, 1992). However, some caution is still in order. Field research may uncover effects that cannot be assessed within the time constraints of laboratory studies. For instance, CEO tenure, regardless of performance, may have an influence on the control of managers by owners. It is also possible that past failures, in the context of escalation research, may trigger a variety of cognitive states (i.e., increased risk aversion) that are different from those past successes trigger; this difference may affect how CEOs respond to incentives.

Finally, our purpose has been to test rather than endorse agency theory predictions, which rely heavily on the notion of the contract. Criticisms of the model by some management scholars notwithstanding, agency theory remains a dominant paradigm in the fields of corporate governance, strategy, and executive compensation (Gomez-Mejia, 1994). The results suggest that, all things considered, there is a need to be more precise in the manner in which the contract's major elements, monitoring and incentive alignment, are treated in agency theory. Further, a more fruitful avenue for the pursuit of understanding how these components affect managerial decision making lies in methodologies more traditionally used in the organizational sciences, such as survey research and laboratory studies. If nothing else, the results presented here should give pause to those who speak about monitoring and incentive alignment as though their effects were similar. Clearly, they are not, as we have shown here. Studying such issues outside the archival data framework should provide those who develop conceptual models of the traditional type with substantial grist for their theoretical mills.

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THE AFFIRMATIVE ACTION STIGMA OF INCOMPETENCE: EFFECTS OF PERFORMANCE INFORMATION AMBIGUITY

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In two studies, 264 male and female managers reviewed information about the job performance of a person portrayed as either a man or a woman and, if a woman, as either an affirmative action hire or not. As expected, subjects rated female affirmative action hires as less competent and recommended smaller salary increases for them than for men and women not associated with affirmative action. This pattern held even when disconfirming performance information was provided if that information was ambiguous either with regard to degree of success (Study 1) or with regard to who was responsible for the success (Study 2).

A recent study has shown that association with an affirmative action effort stigmatizes intended beneficiaries, who are inferred to be incompetent (Heilman, Block, & Lucas, 1992). In this study, both men and women and both students and working people drew such inferences, which were also evidenced whether the target beneficiary was a woman or a member of a minority group or whether the affirmative action label was explicitly communicated or only assumed. These findings built upon and extended research by Garcia, Erskine, Hawn, and Casmay (1982) in which less favorable evaluations were made about the qualifications of minority applicants to a graduate school program when commitment to an affirmative action policy was highlighted; research by Jacobson and Koch (1977) demonstrating that women's leadership performance was devalued when they were appointed leaders solely on the basis of gender; and research by Northcraft (Northcraft & Martin, 1982) in which it was found that a black investment banker was more often paired with a "poor" résumé when said to have been hired to fulfill affirmative action obligations.

The results of these investigations lend support to ideas voiced by Nacoste (1990) in scholarly work and by others in the popular press that affirmative action programs may sometimes do more harm than good for those

targeted to benefit from them (Himmelfarb, 1988; Sowell, 1978; Steele, 1990; Wilkerson, 1991; Wycliff, 1990). However, these findings do not lend insight into the extent of the impact of the affirmative action label. The objective of the research reported here was to examine the robustness of affirmative action–based incompetence inferences and to identify the conditions that regulate when such inferences do or do not dominate decision making relevant to organizational rewards.

The dynamic posited to underlie the stigma of incompetence based on affirmative action is the discounting of a beneficiary's qualifications as a basis for selection and the assumption that the individual was hired only because of his or her group membership. The discounting principle, as stated by Kelly (1972; Kelly & Michela, 1980), suggests that affirmative action provides onlookers with a plausible and salient explanation for a hiring decision that is independent of the hiree's qualifications for the position, so that his or her qualifications are subsequently discounted as having been an important factor in making the decision. Since qualifications are typically so crucial in selection decisions, the perception that they did not play a central role is likely to lead to an assumption that the individual in question is not competent. If this individual were truly qualified, the reasoning goes, he or she would not have needed the help of affirmative action (Pettigrew & Martin, 1987). That is, the perception that ordinary and accepted selection criteria have been suspended paves the way for inferences of incompetence.

But what happens when the beneficiary of affirmative action is on the job, and information about performance becomes available, especially disconfirming information? Studies directly examining the inferences of incompetence that accompany the affirmative action label have tended to focus on reactions to applicants, either graduate school (Garcia et al., 1981) or job (Heilman et al., 1992; Northcraft & Martin, 1982) applicants. Although the second study reported by Heilman and colleagues (1992) examined the reactions of working people to their co-workers, its use of correlational data and its lack of systematic control of co-workers' actual performance levels prohibits conclusions regarding this issue. If, in fact, the inferences of incompetence that accompany the affirmative action label disappear when disconfirming evidence is made available, then they are ultimately of little significance. But if these negative inferences persist despite information to the contrary, then there is a clear need for concern.

There is good reason to expect that performance information will have an impact on inferences about those believed to have been hired through affirmative action. Many organizational researchers have pointed out that category-based inferences dominate impression formation in work settings only when minimal information about an individual is available (Arvey, 1979; Terborg, 1977). Indeed, evidence from a variety of literatures suggests individuating information about a person can weaken or override the influence of categorical information (Locksley, Hepburn, & Ortiz, 1982; Nisbett, Zukier, & Lemley, 1981; Tosi & Einbinder, 1985). These studies suggest that the negative effects of the affirmative action label will disappear as more information about an individual becomes available.

However, there is also evidence that individuating information will not necessarily undermine the influence of categorical information on people's judgments of others (e.g., Heilman, 1984; Krueger & Rothbart, 1988; Kunda & Sherman-Williams, 1982). These studies make it apparent that the nature of the individuating information is of critical importance. It must be not only relevant to but also clearly predictive of the judgment being made if it is to have an impact on that judgment.

But information that is clearly predictive of performance competence is not all that common in work settings. Performance information is most clearly predictive of competence when the individual being assessed is unquestionably the origin of the performance, when the information is seen as representative of the individual's performance in general, and when it is specific and precise, requiring little or no interpretation. These conditions often are not met in organizations, where performance in many instances is subjectively, not objectively, evaluated and where work is increasingly done in teams. When the conditions for prediction of competence are not met and performance information is therefore ambiguous in its implications, people can easily distort it to fit category-based stereotypes or ignore it altogether (Fiske, Neuberg, Beattie, & Milberg, 1987; Nieva & Gutek, 1980).

These ideas suggest that although information about on-the-job performance effectiveness can override the inferences of incompetence arising from the affirmative action label, this is likely to occur when the information is clear and unambiguous in its implications, not susceptible to misinterpretation. But since information about work performance very often lacks such clarity, its mitigating effect on affirmative action–based inferences may be less potent than it might first appear. In fact, performance information may sometimes leave intact or even reinforce a stigma of incompetence arising from association with affirmative action rather than dispel it. To test these ideas, we designed two studies to investigate not only the general effects of disconfirming performance information on inferences of incompetence prompted by association with affirmative action efforts, but also the particular effects of disconfirming information that is more or less ambiguous in its implications.

In the first study, ambiguity was operationally defined in terms of the precision of the performance information subjects received. Subjects, who were managers in a large insurance company, evaluated a hypothetical individual who ostensibly had been employed by their company as a computer programmer for the past six months. We used the job of computer programmer because it has been shown to be male sex-typed, but not to such an extreme that gender-based incompetence inferences arising from the perceived person-job lack of fit would be likely to obscure the effects of affirmative action status (Krefting, Berger, & Wallace, 1978; Macan, Detjen, & Dickey, 1991). The individual being evaluated was said to be either a man or a woman and, if a woman, either was or was not designated as having been the beneficiary of an affirmative action program at the time of her hiring. Performance information, which was provided through a six-month review purportedly completed by the employee's supervisor, was systematically

varied so as to communicate clear success, ambiguous success, failure, or no evaluative information about performance.

We expected that, consistent with earlier work, in the absence of evaluative performance information, association with affirmative action would result in more negative competence evaluations than no association with affirmative action. Thus,

> *Hypothesis 1a. In the absence of performance information, beneficiaries of affirmative action will be judged as less competent than those not associated with affirmative action.*

The provision of disconfirming performance information was expected to mitigate this effect only when the information about success was clear and unequivocal, not when it was ambiguous. Thus,

> *Hypothesis 1b. Information about performance success will eliminate the discrepant competence evaluations of those who are and who are not beneficiaries of affirmative action when the information is unambiguous, but not when it is ambiguous.*

In addition, we attempted to determine just how negative the effect of the affirmative action label was by including in the research design an experimental condition in which subjects were told the ratee had failed. This condition provided a baseline for making such comparisons. Since we were proposing that the affirmative action label would lead to a stigma of *incompetence* (not just a stigma of lesser competence), we expected that, unless clear information that people portrayed as affirmative action beneficiaries had succeeded was provided, they would receive competence evaluations as negative as those received by individuals said to have failed on the job. Thus,

> *Hypothesis 2. For those who are not beneficiaries of affirmative action, both no information about on-the-job success and information about such success (whether ambiguous or unambiguous) will lead to more favorable competence evaluations than failure information; but for beneficiaries of affirmative action, only unambiguous success information will result in more favorable competence evaluations than failure information.*

Competence evaluations were measured directly and also indirectly, through salary recommendations.

STUDY 1: METHODS

Overview

Subjects. Participants in this study were 192 managers at a large insurance company in the Northeast. Of the 192 managers, 51 percent were men ($n = 98$), and 49 percent were women ($n = 94$). Fewer than 1

percent of the managers were under 25 years of age ($n = 1$); 35 percent were between 25 and 34 ($n = 69$); 34 percent were between 35 and 44 ($n = 65$); 25 percent were between 45 and 54 ($n = 49$); and 4 percent were 55 or older ($n = 8$).

Design. The research design was a three-by-four factorial with the independent variables of employee (man, woman, and female affirmative action beneficiary) and performance information (clear success, ambiguous success, no evaluative information, failure). No male affirmative action beneficiary was included because of the male sex-typed nature of the focal job (it would not have been credible that a man had benefited from affirmative action efforts for a job considered to be already male dominated). Subjects were randomly assigned to the 12 conditions, resulting in 16 subjects in each condition. Men and women were represented in approximately equal numbers across conditions.

Procedures. The data of this study were obtained during a series of company-sponsored training sessions. Participation was voluntary in all cases. The research was said to be part of a university-based research program investigating personnel selection, placement, and advancement processes. The material subjects received explained to them that after reviewing an individual's job description, employment application materials, and job activity summary for the first six months on the job, they would be asked to give their reactions to the recently hired individual, make assessments about the individual's likely career success, and provide some recommendations for organizational action. Subjects were told that for purposes of comparison this information was being collected not only from managers like themselves, but also from personnel experts and master's of business administration (M.B.A.) students.

Subjects were then given packets that each included a job description, an employment application, a six-month job activity summary for an individual, and a brief questionnaire. The *job description* followed a standard format and included a job title, department, and a brief outline of job responsibilities. The job was that of computer programmer in the computer services department. The job responsibilities outlined were taken from an actual job description for this position. The *employment application* contained information about the employee's education and work experience. For subjects in all conditions, the employee was depicted as having an appropriate computer-programming technical degree and as having held a related position for two years prior to being hired for the current job. A photograph of the employee appeared in the top right corner of the application; for subjects in all conditions, it showed a white person to ensure that subjects realized that gender, not race, was the basis for the affirmative action status. The bottom of the application form bore the words "For Clerical Purposes Only" and had a space for a hiring recommendation. The *six-month job activity summary* was filled out and apparently signed by the employee's supervisor. The hypothetical employee's name, position, and starting date appeared,

and then this description of the employee's job activities for the last six months:

> Mark [Wendy] spent two weeks in training, obtaining information on computer software and hardware technology. Mark [Wendy] spent approximately 40% of his [her] time diagnosing problems that users encountered with a new system. A good deal of this time was spent translating technical terms into more easily understandable concepts. This included preparing or revising program descriptions, flow charts, and a glossary of terms. And he [she] spent 10 hours updating job control language for specialized programs. The remaining part of Mark's [Wendy's] time was spent developing new program logic in existing modules, installing and maintaining systems software, and testing all new modules.

This job activity description was designed to be straightforward and non-evaluative. As will be explained in the next section, for subjects in some conditions only this information appeared in the job activity summary, whereas for those in other conditions, a performance rating made by the employee's ostensible supervisor also appeared.

Subjects were instructed to complete the research questionnaire after they had reviewed all the materials. When finished, subjects were debriefed and the purpose of this study was explained.

Experimental Manipulations

Employee. The employee's gender was manipulated by the name (Wendy or Mark Campbell) and the photograph used on the application form. The photographs, which had been used in earlier research in this area (Heilman et al., 1992) were 4 × 6 mm black-and-white portrait photographs. These male and female photos have been shown not to differ in terms of others' ratings of the individual's attractiveness, sociability, intellectual skills, and emotional adjustment (Heilman & Martell, 1986).

Affirmative action status was manipulated via the bottom section of the employment application designated as for clerical purposes. Subjects in the affirmative action conditions saw a hiring recommendation that read "Hired Through Women/Minority Recruiting Program." Subjects in the other conditions saw only the word "Hired," for both the male and female hypothetical employees. For all subjects, the hiring recommendation was initialed by an employment officer.

Performance information. Performance information was manipulated via the six-month job activity summary supposedly completed by the employee's supervisor. For subjects in the no-evaluative-information condition, it contained only the supervisor's description of the employee's job activity. For those in the remaining conditions, the supervisor's statement was followed by a question asking the supervisor to check the category that best described the employee's job performance during the first six months. In the success conditions, the employee was always rated in the highest available

category, but the range of possible categories shown on the form differed depending upon whether the success was to be clear and unequivocal or somewhat ambiguous. In the clear success condition, there were five rating categories: top 5 percent, top 10 percent, top 20 percent, top 50 percent, and bottom 50 percent. In contrast, there were two rating categories in the ambiguous success condition: top 50 percent and bottom 50 percent. Thus, the response format with the more differentiated checklist enabled a less ambiguous representation of successful performance.[1] Finally, subjects in the failure condition saw that the employee had been placed in the bottom 50 percent performance category.

Dependent Measures

Our primary dependent variables were competence evaluations and salary recommendations. Competence evaluations were assessed via three questions rated on nine-point scales: "How would you rate this employee's performance over the first six months?" (excellent–poor), "How competently did this individual perform this job?" (very competently—not at all competently), and "How effective do you think this individual is at doing the work?" (very effective–not at all effective). We combined these three items into a single competence evaluation scale ($\alpha = .96$). Recommendations for a salary increase were obtained by means of another question with a nine-point response scale: "How appropriate do you feel it would be for this individual to receive a salary increase?" (very appropriate–not at all appropriate).

Two additional questions were asked to provide insight into perceptions about preferential treatment that might have influenced subjects' responses to the employee hired through affirmative action: "To what extent do you think this individual was hired because of his or her qualifications to do the job well?" (completely–not at all) and "How important do you think that special treatment was in accounting for the employee's performance?"(very important–not at all important).

STUDY 1: RESULTS

Manipulation Checks

To determine if the manipulation of the employee's gender was effective, we asked subjects to report the name of the person whose materials they reviewed. In all cases subjects correctly identified that they were evaluating either a man or a woman. The manipulation of affirmative action status also

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[1] Pilot work with 28 subjects from a population similar to that from which study participants came validated this manipulation. When asked to indicate on a nine-point scale how clear it was to them how the employee had performed (not at all clear, 1; very clear, 9), subjects exposed to the clear success stimulus material indicated significantly greater clarity ($\bar{x} = 7.23$) than the subjects exposed to the ambiguous success stimulus material ($\bar{x} = 3.31$, $t_{24} = 6.32$, $p < .001$).

had its intended effect. When, at the end of the research questionnaire, subjects were asked to indicate whether the individual whose materials they reviewed was or was not hired through a special recruiting program, 95 percent of them responded correctly in terms of their experimental condition; the few incorrect responses were distributed roughly equally across conditions.

To ensure that the job described was perceived as being male sex-typed, a necessity if the affirmative action manipulation was to seem plausible, subjects rated the job on a number of scales, one of which was anchored by masculine (1) and feminine (9). The mean rating of the job on this scale was 3.85, indicating that the computer programmer job was indeed seen as male sex-typed but, as we had planned, not extremely so.

Dependent Measures

A three-by-four multivariate analysis of variance was conducted on the four ratings composing the dependent measures. Overall, the multivariate F was significant for employee ($F_{8, 350} = 6.52$, $p < .001$), for performance information ($F_{12, 524} = 22.23$, $p < .001$), and for the interaction between them ($F_{24, 698} = 1.63$, $p < .05$). Having determined these overall effects, we conducted univariate three-by-four analyses of variance and then intercell contrasts using the Fisher least-significant-difference (LSD) method, with the significance level for all contrasts set at $p < .05$. Entering the gender and age of each subject into two separate analyses of variance yielded no significant effects for either variable, and all data reported here are for the full sample. Correlations among the dependent measures appear in Table 1. Table 2 presents condition means, standard deviations, and significance test results for intercell contrasts for the dependent measures.

Competence evaluations. Analysis of variance of the competence evaluation scale indicated a significant main effect for employee ($F_{2, 180} = 11.10$, $p < .001$, $\eta^2 = .04$), for performance information ($F_{3, 180} = 90.97$, $p < .001$, $\eta^2 = .54$), and for the interaction between them ($F_{6, 180} = 5.38$, $p < .001$, $\eta^2 = .06$).

The main effect for employee type suggested an overall tendency for the women identified as affirmative action beneficiaries to be evaluated more negatively in terms of competence than both the non–affirmative action women and the men. But the interaction effect suggested that these differ-

TABLE 1
Correlations of the Dependent Measures, Study 1

Measures	1	2	3
Competence evaluation scale			
Recommended salary increase	.64**		
Hired because of qualifications	.23*	.14	
Performance because of special treatment	−.09	−.08	.24**

* $p < .05$
** $p < .01$

TABLE 2
Means and Standard Deviations of the Dependent Measures, Study 1[a]

Experimental Conditions	Competence Evaluation[b]	Salary Recommendations[b]	Role of Qualifications[c]	Special Treatment[d]
Clear success				
Affirmative action				
women	7.78 (0.87)$_a$	8.37 (1.03)$_a$	6.31 (1.74)$_a$	3.06 (1.81)
Women	7.71 (1.00)$_a$	8.00 (1.16)$_a$	7.50 (1.21)$_b$	3.25 (2.08)
Men	7.81 (0.97)$_a$	8.00 (1.79)$_a$	7.69 (1.20)$_b$	2.94 (1.88)
Ambiguous success				
Affirmative action				
women	5.47 (0.81)$_b$	6.70 (1.32)$_{b,c}$	5.94 (2.08)$_a$	4.00 (2.58)
Women	6.73 (0.72)$_{c,d}$	8.00 (1.27)$_a$	7.50 (1.16)$_b$	2.87 (1.46)
Men	7.35 (0.96)$_{a,c}$	7.87 (1.03)$_a$	7.12 (1.41)$_b$	3.06 (1.81)
No evaluative performance information				
Affirmative action				
women	5.37 (1.10)$_b$	6.44 (2.07)$_{b,c}$	5.75 (1.61)$_a$	4.12 (2.34)
Women	6.46 (0.86)$_d$	7.92 (1.46)$_a$	7.19 (0.98)$_b$	2.62 (1.75)
Men	6.96 (0.79)$_{c,d}$	8.25 (1.24)$_a$	7.44 (1.41)$_b$	3.00 (1.93)
Failure				
Affirmative action				
women	4.87 (1.04)$_{b,e}$ '	5.75 (2.30)$_{b,c}$	5.69 (2.18)$_a$	3.69 (2.15)
Women	4.37 (0.90)$_e$	5.37 (1.93)$_c$	7.00 (1.79)$_b$	3.12 (1.89)
Men	4.87 (1.10)$_{b,e}$	6.16 (1.84)$_{b,c}$	7.11 (1.59)$_b$	3.19 (1.76)

[a] Standard deviations are in parentheses; $n = 16$ in each condition. Means in a column with different subscripts differ significantly at $p < .05$, as indicated by the Fisher LSD procedure. The critical difference between means necessary to reach significance was 0.65 for competence evaluation, 1.14 for salary recommendations, and 0.72 for ratings of the role of qualifications.

[b] The higher the mean, the more favorable the rating.

[c] The higher the mean, the more likely it was qualifications were thought to play a role in the hiring process.

[d] The higher the mean, the more important special treatment was believed to be in accounting for the employee's performance.

ences in ratings did not happen under all performance information conditions, and a series of intercell contrasts further clarified these results. Whereas ratings of the affirmative action women did differ from those of both non–affirmative action women and men among subjects in the no information conditions and those in the ambiguous success conditions, for subjects in clear success conditions, ratings did not differ across these groups (see Table 2). Thus, consistent with Hypotheses 1a and 1b, success information effectively mitigated the negative inferences about competence associated with the affirmative action label, but only when the success information was clear and unambiguous; when it was ambiguous, success information did little to attenuate negative reactions to women associated with affirmative action. As might be expected, no significant differences among target ratings were found among subjects in failure information conditions.

To fully address Hypothesis 2, the main effect for performance information required further clarification. Here, intercell contrasts made it clear that the source of the effect differed depending upon the type of employee (see Table 2). They indicated that competence ratings of women associated with affirmative action were no different when no evaluative information was provided than when failure information was conveyed. There also was no difference in the competence ratings of affirmative action women when ambiguous success information was conveyed and when failure information was conveyed. As anticipated, it was only when information of clear success was provided to subjects that the success information made a difference in how affirmative action women were evaluated as compared to when failure information was provided. This data pattern stands in sharp contrast to the pattern of competence ratings for men and for women not associated with affirmative action, both of whom were viewed as more competent when any type of success information, or even no evaluative information, was provided than when the failure information was provided.[2]

Salary recommendations. The results of the analyses of the rated appropriateness of a salary increase followed a pattern similar to that of the competence evaluations. Analysis of variance produced a significant main effect for employee ($F_{2, 180} = 6.91$, $p < .01$, $\eta^2 = .02$) and for performance information ($F_{3, 180} = 19.73$, $p < .001$, $\eta^2 = .24$) and a significant interaction between them ($F_{6, 180} = 7.14$, $p < .001$, $\eta^2 = .30$).

The main effect for employee type indicated a general tendency for women associated with affirmative action to be more harshly treated in terms of salary recommendations than either non–affirmative action women or men. But intercell contrasts made it clear that, consistent with Hypotheses 1a and 1b, the effect of affirmative action status was dependent upon performance information. The results indicated no significant difference between recommendations for affirmative action women and both non–affirmative action women and men when subjects were under the clear success or failure conditions; however, these differences were indicated under the ambiguous success and no information conditions (see Table 2). Thus, as with competence evaluations, negativity was evident in judgments about employees viewed as beneficiaries of affirmative action even when disconfirming performance information was made known; it was only when it was unambiguous that disconfirming performance information had a mitigating effect.

Support was also provided for Hypothesis 2. Further analysis of the performance information main effect once again demonstrated that the effect

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[2] It should be noted, however, that responses to non–affirmative action women were more differentiated than responses to either the male employees or the female affirmative action employees. Not only did failure information result in lower ratings (as it did for the men), but also, clear success information resulted in higher ratings (as it did for the affirmative action women) than did ambiguous success information.

had a different source in each of the employee type conditions. Intercell contrasts indicated that, as we had expected, the salary recommendations for affirmative action women were no different when either no evaluative performance information was provided or ambiguous success information was provided and when failure information was provided. Only when clear success information was conveyed were affirmative action women recommended more highly than when failure information was conveyed (see Table 2). This data pattern for the effects of information type on affirmative action women again differed markedly from the effects on men and non–affirmative action women, both of whom received enthusiastic salary recommendations unless subjects were told they had failed in their performance.

Additional Findings

Perceptions of the role of qualifications. Analysis of variance of subjects' beliefs about the role qualifications played in the hiring process revealed a significant main effect for employee ($F_{2, 180} = 16.92$, $p < .001$, $\eta^2 = .16$). No other significant effects were found. Intercell contrasts indicated that whatever the type of performance information, women associated with affirmative action were significantly less often seen as having been hired because of their qualifications than were either men or women who were not designated as affirmative action hires (see Table 2). This pattern is consistent with the idea that our subjects subscribed to a view of affirmative action that downplays the role of qualifications in selection decisions. There was no significant difference in the degree to which qualifications were thought to play a role in the hiring of men and women not associated with affirmative action.

Because we posited that these perceptions would play a mediating role in competence evaluation, we conducted an analysis of covariance. Results supported the presence of mediation, indicating that when perceptions of the role of qualifications were removed from the competence ratings, the main effect for employee ($F_{2, 180} = 2.20$, n.s.) and the two-way interaction between employee and performance information ($F_{6, 180} = 1.82$, n.s.) were no longer significant. However, this was not the case for the salary recommendations, for which the effect for employee ($F_{2, 180} = 8.15$, $p < .001$) and the employee-by-information interaction ($F_{6, 180} = 5.29$, $p < .001$) remained statistically significant when the perceived role of qualifications was treated as a covariate.

Perceptions of "special treatment" as a cause of performance. Analysis of variance of the assessments of special treatment in accounting for the employee's performance revealed no significant effects. Evidently, preferential on-the-job treatment was not presumed to be more prevalent for those who benefited from affirmative action in selection than for other employees. Given this result, we conducted no exploration of its potential mediating role.

STUDY 1: DISCUSSION

The results reported here provide additional verification that a stigma of incompetence is associated with those labeled as having benefited from affirmative action. As in earlier research (Heilman et al., 1992), subjects thought that qualifications played less of a role in selection decisions regarding affirmative action beneficiaries than in decisions regarding others. And, without information to the contrary, subjects assumed the competence of those who benefited from affirmative action to be much inferior to that of those not associated with affirmative action and no different from the competence of those reported to be performing poorly. Salary recommendations followed the same pattern, strongly suggesting that the negativity arising from association with affirmative action affects not only evaluations, but also the perceived appropriateness of organizational rewards.

The results also make it clear that disconfirming information about successful performance does not always override the negative competence inferences accompanying the affirmative action label. It was only when the information of success was unequivocally clear that it had this effect; success information of a more ambiguous nature had no effect whatsoever on dissipating the affirmative action stigma. In fact, when an employee was associated with affirmative action, reactions to ambiguous information about success were no different from reactions to information about failure. Thus, whereas these data demonstrate that disconfirming information can effectively override incompetence inferences based on affirmative action status when raters make evaluations and recommend organizational rewards, the data also indicate that this is by no means an automatic or routine occurrence.

The results also provide support for the mediating role of the discounting process in determining negative competence evaluations of affirmative action beneficiaries. When perceptions about the degree to which qualifications entered into the hiring decision were taken into account, all significant effects involving method of selection were eliminated. The results further indicated that perceptions about the role of qualifications mediated only competence perceptions, not salary recommendations, suggesting that not all outcomes of being associated with affirmative action are regulated by the same processes. Evidently some other by-product of affirmative action status, perhaps unfairness perceptions, negative affect, or both, mediated its effect on salary recommendations.

Despite the strong support provided for our hypotheses, care must be exercised in interpreting these results. Although we tried not to imply lesser success in our ambiguous success induction than in our clear success induction, our manipulation of information ambiguity may have been confounded with perceived differences in performance level. That is, for subjects in the unambiguous success conditions, the mean expected value of the employee's performance was considerably higher than it was for those in the ambiguous success condition. It therefore is conceivable that those in un-

ambiguous conditions were seen as more successful than those in ambiguous conditions, and that it is this difference, not the information ambiguity difference, that was responsible for the observed effects.

To explore this possibility and, in so doing, further test our ideas, we conducted a second study in which success information was always provided, but the ambiguity construct was operationally defined in a very different manner than in the first study. In this second study, we systematically varied attributional ambiguity. That is, although all subjects were provided with the same information about successful performance, they were given different possible accounts of how this performance had come about. Specifically, a report that coaching by a senior co-worker had been available was designed to raise questions, for subjects in the ambiguous information conditions, about the degree to which the employees were the unique source of their success.

Subjects, who were managers in the same insurance company that served as the site for Study 1, again evaluated a hypothetical individual who ostensibly had been employed as a computer programmer. Performance information provided through a performance review instrument always conveyed a high level of performance success, but the clarity of the source of the performance success differed for subjects in the clear and the ambiguous success conditions. We predicted the following:

> *Hypothesis 3. Beneficiaries of affirmative action will be judged as less competent than those not associated with affirmative action when information about on-the-job success is ambiguous in its implications, but not when it is unambiguous in its implications.*

STUDY 2: METHODS

Overview

Subjects. These were 72 managers from the same insurance company sampled in Study 1. Of this group, 44 percent were men ($n = 32$), and 55.6 percent were women ($n = 40$). Age ranges were as follows: 1.4 percent of the managers were under 25 ($n = 1$), 51.4 percent were between 25 and 34 ($n = 37$), 30.6 percent were between 35 and 44 ($n = 22$), 13.9 percent were between 45 and 54 ($n = 10$), and 2.8 percent were 55 or older ($n = 2$).

Design. The research design was two-by-three factorial in which employee (man, woman, affirmative action woman) and performance information (clear success, ambiguous success) were the two independent variables. Random assignment of subjects to the six experimental conditions resulted in 12 subjects in each. The proportions of women and men were roughly equivalent, with either 6 or 7 women in each condition.

Procedures. The procedures were identical to those used in Study 1, except that all subjects received the same information about the hypothetical employee's performance success. Success information was conveyed via a

six-month activity summary that, once again, contained a hypothetical supervisor's description of the employee's job activity and an area in which the supervisor had checked the category that best described the employee's job performance during this initial six-month period. But the possible categories were not percentage groups, as they were in Study 1. Instead, the categories were "far exceeded expectations," "exceeded expectations," "met expectations," and "did not meet expectations," and in all cases, the "far exceeded expectations" category was the one designated.

Experimental Manipulations

Employee. The manipulation of the employee's gender and affirmative action status was the same as that used in Study 1.

Performance information. The ambiguity of the performance information was manipulated through the six-month job activity summary. For subjects in the clear information conditions, the supervisor's description of the employee's job activity was the same as that used in Study 1. But for those in the ambiguous information condition, we appended the following sentence to the supervisor's description of the employee's job activity:

> Throughout this period Mark [Wendy] was coached by a senior computer programmer (as are all new hires in our department). The coach was available to Mark [Wendy] on an "as needed" basis, and could be called upon to act as a consultant when problems arose.

Dependent Measures

The competence evaluation measure ($\alpha = .93$) was the same as that used in the first study. Given the nature of the ambiguity manipulation, we included this attributional question as an additional measure of perceived competence: "How important do you think the employee's skill was in accounting for his/her performance?" (very important, 1; very unimportant, 9). Both recommendations and subjects' beliefs about the role of qualifications in the selection process and the importance of special treatment in accounting for the employee's performance were once again obtained.

STUDY 2: RESULTS

Manipulation Checks

The manipulation of the employee variable had its intended effect. All participants correctly indicated the gender of the employee they were evaluating, and only one subject (in the female, ambiguous information condition) incorrectly responded to the question concerning whether the individual under review was or was not hired through a special recruiting program. The manipulation of information ambiguity also proved to be effective. All subjects responded correctly in terms of experimental condition to the question appearing at the end of the research questionnaire, "Was this individual

reported to have a coach during this period?" (yes, no). Finally, ratings of the computer programmer job described in the stimulus materials on a scale anchored by masculine (1) and feminine (9) indicated that, as in Study 1, subjects saw the job as somewhat, but not overwhelmingly, male sex-typed ($\overline{x} = 4.12$).

Dependent Measures

We conducted a two-by-three multivariate analysis of variance on the five dependent measures in the study. The multivariate F was significant for employee ($F_{10, 122} = 6.75$, $p < .001$) and for the interaction between employee and performance information ($F_{10, 122} = 2.41$, $p < .05$). The mean effect for performance information was not significant ($F_{5, 62} = 1.88$, n.s.). We then conducted univariate analyses of variance followed by intercell contrasts using the Fisher LSD method. As in Study 1, analysis of variance indicated that there were no significant effects for either gender or age of subject, and all data reported here are for the full sample. Correlations among the dependent measures appear in Table 3. Condition means, standard deviations, and significance tests for intercell contrasts for the dependent measures are presented in Table 4.

Competence evaluations. Analysis of variance of the competence evaluation scale indicated a significant main effect for employee ($F_{2, 66} = 5.16$, $p < .01$, $\eta^2 = .10$), for performance information ($F_{1, 66} = 9.45$, $p < .01$, $\eta^2 = .10$), and for the interaction between them ($F_{2, 66} = 6.33$, $p < .01$, $\eta^2 = .33$). Intercell contrasts further clarified these results: whereas ratings of affirmative action women did not differ from those of non–affirmative action women and men when the information conveyed about success was not ambiguous, they did differ from ratings of both non–affirmative action women and men when the information conveyed about success was ambiguous. These results supported the hypothesis.

Skill attributions. Because the manipulation of information ambiguity involved the clarity of the source of performance, an additional measure of perceived competence is the degree to which subjects viewed the hypothetical employee's skill as central to the successful performance outcome.

TABLE 3
Correlations of the Dependent Measures, Study 2

Measures	1	2	3	4
1. Competence evaluation scale				
2. Recommended salary increase	.47**			
3. Skill attribution	.61**	.23		
4. Hired because of qualifications	.49**	.42**	.48**	
5. Performance because of special treatment	−.10	−.18	−.24*	−.02

* $p < .05$
** $p < .01$

TABLE 4
Means and Standard Deviations of Dependent Measures, Study 2[a]

Experimental Conditions	Competence Evaluation[b]	Salary Recommendation[b]	Skill Attributions[c]	Role of Qualifications[d]	Special Treatment[c]
Clear success					
Affirmative action women	7.86 (1.09)a	8.17 (1.19)a	7.92 (1.51)a	5.33 (0.89)a	3.75 (1.96)
Women	7.59 (1.01)a	7.92 (1.38)a	7.83 (1.03)a	7.00 (1.41)b	4.17 (2.17)
Men	7.81 (0.98)a	7.75 (1.14)a	7.92 (1.31)a	6.92 (0.52)b	3.67 (1.67)
Ambiguous success					
Affirmative action women	5.97 (1.01)b	6.58 (1.24)b	6.42 (1.51)b	4.17 (1.70)a	4.00 (2.30)
Women	7.39 (0.92)a	8.25 (0.87)a	8.08 (1.80)b	7.25 (1.14)b	4.33 (2.46)
Men	7.83 (0.97)a	8.33 (0.65)a	8.17 (0.72)a	7.25 (0.91)b	3.67 (1.78)

[a] Standard deviations are in parentheses; $n = 12$ in each condition. Means in a column with different subscripts differ significantly at $p < .05$, as indicated by the Fisher LSD procedure. The critical difference between means necessary to reach significance was 0.82 for competence evaluation, 0.90 for salary recommendations, 1.0 for skill attributions, and 1.08 for the role of qualifications.

[b] The higher the mean, the more favorable the rating.

[c] The higher the mean, the more important the employee's skill or special treatment were believed to be in accounting for the employee's performance.

[d] The higher the mean, the more likely qualifications were thought to play a role in the hiring process.

Analysis of variance of subjects' ratings indicated a significant main effect for employee ($F_{2, 66} = 3.81$, $p < .05$, $\eta^2 = .09$) and a significant employee-information interaction ($F_{2, 66} = 4.17$, $p < .05$, $\eta^2 = .21$). Intercell comparisons demonstrated the nature of this effect. Consistent with the hypothesis, there were no differences in attributions to the employee's skill when the performance information was clear, but when the information was ambiguous, the skill of the employee was seen as less important in accounting for the successful performance outcome when the employee was associated with affirmative action than when he or she was not. It therefore appears that in the ambiguous success conditions, the same information about the availability of coaching resulted in different attributions depending upon which employee was being reviewed.

Salary recommendations. Analysis of variance of subjects' salary recommendations indicated a main effect for employee ($F_{2, 66} = 3.10$, $p < .05$, $\eta^2 = .07$) and a significant interaction of employee and performance information ($F_{2, 66} = 6.90$, $p < .01$, $\eta^2 = .24$). Follow-up intercell contrasts further clarified these results: as we predicted, only subjects in unambiguous success conditions treated an employee who had benefited from affirmative action similarly to others; when information about success was ambiguous, the employee associated with affirmative action was treated more harshly in terms of salary recommendations than either the non–affirmative action women or the men.

Additional Findings

Perceptions of the role of qualifications. Analysis of variance of subjects' beliefs about the role qualifications played in the hiring process indicated a significant main effect for employee ($F_{2, 66} = 34.87$, $p < .001$, $\eta^2 = .49$) and a significant interaction of employee and performance information ($F_{2, 66} = 3.86$, $p < .05$, $\eta^2 = .54$). As in Study 1, intercell comparisons revealed that subjects in both ambiguous and unambiguous conditions significantly less often saw women associated with affirmative action as having been hired because of their qualifications than either men in general or women not associated with affirmative action. (No difference was found between reactions to men and to women not associated with affirmative action.) However, unlike the results of Study 1, the results of Study 2 yielded a significant difference in perceptions of the role of qualifications in the affirmative action condition, with qualifications seen as having played more of a role when success was clear than when it was ambiguous. Evidently, the performance outcome can influence perceptions of the process by which an employee was hired, a point that is suggestive about the potential dynamism of these perceptions.

Analysis of covariance once again supported the mediating role of these perceptions on competence evaluations. When perceptions of the role of qualifications were "co-varied out," the main effects for employee and the employee-by-information performance interaction were no longer statistically significant ($F_{2, 66} = 1.96$, n.s., and $F_{2, 66} = 2.42$, n.s., respectively). This

data pattern was also obtained in covariance analysis of the skill attribution data ($F_{2, 66} = 0.02$, n.s., and $F_{2, 66} = 2.04$, n.s., respectively). However, although the employee main effect for the salary recommendations was no longer significant when the ratings of the perceived role of qualifications were removed ($F_{2, 66} = 2.40$, n.s.), the interaction between employee and performance information remained significant ($F_{2, 66} = 5.47$, $p < .01$). These results suggest that, as in Study 1, the perceived role of qualifications in the selection process mediated assessments of the employee's competence, but not the judgments about how he or she should be treated in terms of salary increase.

Perceptions of "special treatment" as a cause of performance. Analysis of variance again indicated no significant effects in the subjects' perceptions that the employee had received special treatment.

STUDY 2: DISCUSSION

These results, which replicate those found in Study 1, lend additional support to our central thesis. Using a totally different operational definition of performance ambiguity, we demonstrated the same phenomenon—only success information that was unambiguous in its implications for an individual's competence negated the stigma of incompetence attached to beneficiaries of affirmative action. This pattern of findings dominated regardless of whether the indicator was a direct competence evaluation, a causal attribution to the employee's skill, or a decision about the appropriateness of a salary increase. Evidently, ambiguity allowed subjects to dismiss or ignore information contrary to category-based expectations; the disconfirmatory potential of the successful performance information was undercut by its lack of clarity.

Also replicated was the finding that qualifications were thought to play less of a role in the hiring of employees associated with affirmative action than in the hiring of employees not associated with affirmative action. Covariance analyses provided additional support for the idea that beliefs about the role of qualifications mediated competence evaluations. These results are consistent with the discounting principle—that the perceived discounting of qualifications leads to negative assumptions about competence.

GENERAL DISCUSSION

These studies, taken together, provide strong support for the idea that there is a stigma of incompetence associated with affirmative action. They also indicate that people tend to discount qualifications as the basis for the hiring of those associated with affirmative action and suggest that this discounting process mediates competence evaluations. These findings are consistent with those of earlier research (Heilman et al., 1992) and reviews of the literature (Crosby & Clayton, 1990). Moreover, in these two studies the negative competence inferences accompanying the affirmative action label were not easily overpowered by information about successful job performance. To

have such a disconfirmatory effect, the success information had to be un-
equivocal in its implications for the individual's competence. Success in-
formation that was either imprecise and vague about the degree of success an
employee had achieved (Study 1) or unclear about the origin of that success
(Study 2) had the same consequence—no mitigating effect whatsoever on the
affirmative action stigma. These results are noteworthy in that they docu-
ment the potential strength of the affirmative action–based stigma of incom-
petence and its tenacity. Apparently, people resist relinquishing a negative
view of those associated with affirmative action; such individuals seem to
remain incompetent in the minds of onlookers unless they are proved to be
competent.

The results of these investigations are disheartening. It appears that the
stigma of incompetence that can arise from the affirmative action label is
quite potent. It will not, it seems, just go away. This finding is important
because ambiguity about performance is inherent in typical organizational
settings. The conditions necessary to counteract the affirmative action
stigma most often are not present either because the success of a work prod-
uct cannot be precisely calculated and inference is required to assess it, or
because the work context is such that work is performed interdependently
and the unique contribution of any one individual to a team's product is
difficult to discern objectively. In either case, the results reported here
would suggest that the affirmative action stigma of incompetence would
persist regardless of an employee's success, promoting frustration for the
employee and biased decision making among others in the work setting.

There are a number of points to be made in interpreting the data from
these studies. First, it is important not to misinterpret the general lack of
difference found between ratings for men and those for women not associ-
ated with affirmative action. We purposely selected a target job that was only
mildly male sex-typed to enable us to isolate the effects of affirmative action,
separating it from ordinarily sex stereotypic performance evaluation pro-
cesses that have been discussed in the literature and demonstrated in past
investigations (Arvey & Campion, 1982; Dipboye, 1987; Heilman, 1983) and
to prevent the presumption of affirmative action as the basis of hiring from
the person's gender identity alone. It therefore was our intention to keep
sex-based differences in evaluations at a minimum, and our results in no
way imply that such differences do not frequently occur. In fact, despite our
efforts, there were some differences in how non–affirmative action men and
women were evaluated in terms of competence in Study 1: men were viewed
as highly competent except when information of failure was provided, but
women tended to be viewed as highly competent only when unambiguous
information of success was provided. Also, it was our intention to deter
assumptions that affirmative action had guided hiring decisions when it was
not explicitly mentioned, but these data do not imply that such assumptions
are not frequently made in the absence of information when a more strongly
male sex-typed job is involved. And, although it is possible that the results
reported here are limited to situations in which the role of affirmative action

in selection is explicitly communicated, findings from previous studies (Garcia et al., 1982; Heilman et al., 1992) that document the occurrence of negative competence evaluations when association with affirmative action is not explicit but inferred suggest that they are of relevance to any situation in which affirmative action is believed to have been operative. However, because people are rarely explicitly identified as affirmative action hires, additional research is needed to directly examine the proposition that beliefs about affirmative action involvement in selection arising from direct and indirect sources have similar consequences.

A number of cautionary notes should also be sounded. It should be noted that the time frame used in this study was fairly short. Perhaps in data based on a period of time longer than six months the stigma of incompetence evidenced here would not be evident, even if raters had no clearcut success information. Our data cannot address this question or help to assess the persistence of the stigma when disconfirming information is provided repeatedly over time. Also, our manipulations of ambiguous success, although different from one another, are still limited. Investigations using other manipulations of ambiguous success, such as providing mixed performance information or mixed reactions to the employee from a number of evaluators, or information that is not necessarily representative of the individual's work, would be helpful in furthering understanding of the conditions regulating the stigmatizing effects of affirmative action and the implications for people in work settings. In addition, care should be taken in generalizing these findings, especially given the findings of Kravitz and Platania (1993) documenting different reactions to affirmative action among people from different demographic groups. We found no gender differences in either study (a critical result, given our use of a gender-based affirmative action manipulation) but, because we were not permitted to collect racial or ethnic information from respondents, we had no way to assess racial or ethnic differences in responses. Finally, because men associated with affirmative action were not included in the research, it is not clear from these data whether it is affirmative action per se or affirmative action with regards to women that is the impetus for the results obtained here. Although there is some indication from earlier research that there is a stigma of incompetence for what is presumed to be racially based affirmative action, whether the beneficiary is male or female (Heilman et al., 1992), it remains to be seen whether white men, too, are burdened with a stigma of incompetence when they are viewed as preferentially selected for a heretofore female sex-typed position. More generally, it is unclear whether the stigma of incompetence occurs only when the targets of affirmative action are members of groups about whom performance expectations are stereotypically negative; focusing on targets from minority groups about whom positive performance expectations exist, such as Asian Americans, would help clarify this point.

In sum, the findings presented here provide additional evidence that affirmative action initiatives may have harmful consequences, not only for those intended to benefit from them, but also for the ultimate effectiveness

of an organization in using its human capital. The practical implications of these results are quite straightforward. They point to the need to structure tasks and set criteria that will provide performance information that is as clear and unambiguous as possible for those believed to be associated with affirmative action. Our results therefore underscore the importance for an organization of a sound performance appraisal system, one in which individual contribution can be documented in an objective, concrete, and even public way. The results are also suggestive about the importance of making efforts to emphasize the role that job qualifications play in the hiring of individuals who are members of groups that might be seen as benefiting from affirmative action initiatives. But, in a larger sense, the findings of these studies add to a growing body of literature that questions whether use of affirmative action might, under some conditions, undermine its very objectives, fostering a different type of discrimination, one perhaps less obvious, but no less destructive in its impact (Heilman, 1994). Work examining affirmative action policies and the different implementation strategies used in enacting them (e.g., Nacoste, 1990, 1992) clearly is needed if such unintended by-products of affirmative action are to be avoided.

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EVENT STUDIES IN MANAGEMENT RESEARCH: THEORETICAL AND EMPIRICAL ISSUES

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We examined the use of event studies in management research and found that there was inadequate attention paid to theoretical and research design issues. This lack of attention may lead to false inferences regarding the significance of the events and the validity of the theories being tested. To illustrate the extent of this problem, we attempted to replicate three recent studies. To guide authors and reviewers, we outline procedures for appropriate use of the event study method.

The event study method is a powerful tool that can help researchers assess the financial impact of changes in corporate policy. Using this method, a researcher determines whether there is an "abnormal" stock price effect associated with an unanticipated event. From this determination, the researcher can infer the significance of the event. This method has been used extensively in accounting and finance, often to measure the impact of corporate control changes. In management, the framework has been used to judge the effects of endogenous corporate events such as divestiture from South Africa, corporate control changes, corporate refocusing, CEO turnover, the use of affirmative action programs, layoffs, plant closures, corporate illegalities, product recalls, customer service changes, diversification programs, strategic investment decisions, and the formation of joint ventures, as well as the effects of exogenous events such as the enactment of major legislation, the appointment of top executives to cabinet positions, and the deaths of CEOs.

The event study method has become popular because it obviates the need to analyze accounting-based measures of profit, which have been criticized because they are often not very good indicators of the true performance of firms. For example, managers can manipulate accounting profits because they can select accounting procedures (Benston, 1982). Stock prices, on the other hand, are not as subject to manipulation by insiders. Stock prices are supposed to reflect the true value of firms, because they are assumed to

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reflect the discounted value of all future cash flows and incorporate all relevant information. Therefore, event studies, which are based on stock price changes, should measure the financial impact of a change in corporate policy, leadership, or ownership more effectively than a methodology based on accounting returns. Furthermore, the event study method is relatively easy to implement, because the only data necessary are the names of publicly traded firms, event dates, and stock prices.

Given that this method is increasingly used to assess the impact of managerial decision making, it is important to consider whether it has been implemented correctly, whether results have been reported clearly, and whether the interpretation of results has been appropriate. It is well established that the usefulness of this analytical technique depends heavily on a set of rather strong assumptions (Brown & Warner, 1980, 1985). We review these assumptions in the section on event studies. If these assumptions are violated, the empirical results may be biased and imprecise, and, therefore, basing conclusions on them is problematic. Additionally, research design issues affect the results obtained with this framework. It is possible that some theories have been unjustifiably supported because of inappropriate technique. Given these concerns, it is important that researchers report the steps taken in implementing the methodology so that readers can have confidence in the inferences drawn.

One way to determine the extent to which research design issues affect the results of such studies is to reexamine the data using an alternative design. Doing so is difficult in management research, because management journals do not require authors to make their data available to others. We were able to replicate three recent studies, two because the necessary data were included in the papers and one because an author was willing to make his data available. The results of these replications show that our concerns about the validity of the assumptions and the implementation of the methodology are valid. To address this problem constructively, in our recommendations we outline a procedure for implementing an event study of managerial decisions.

We do not have any quarrel with the validity of the event study methodology or its use in management research, per se. Our primary concern involves the empirical implementation and the paucity of information provided to readers regarding research design and implementation issues. Neither is it our intention to criticize *all* event studies published in management journals. Many appear to have been well designed and executed. However, the lack of information regarding the validity of assumptions and several research design issues in some articles raises questions about the confidence that readers can place in the conclusions drawn.

The problem is that misuse by some is tainting the work of others who employ the method correctly. Given that management event studies have important organizational and public policy implications, it is critical that their research designs and implementations be flawless.

EVENT STUDIES: ASSUMPTIONS AND RESEARCH DESIGN ISSUES

The event study method was developed to measure the effect of an unanticipated event on stock prices. The standard approach is based on estimating a market model for each firm and then calculating abnormal returns. These abnormal returns are assumed to reflect the stock market's reaction to the arrival of new information. The method is as follows: The rate of return on the share price of firm i on day t is expressed as

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it},$$

where

R_{it} = the rate of return on the share price of firm i on day t,
R_{mt} = the rate of return on a market portfolio of stocks (such as Standard & Poor's 500 or a market index) on day t,
α = the intercept term,
β = the systematic risk of stock i,
and
ε_{it} = the error term, with $E(\varepsilon_{it}) = 0$.

From estimation of the above equation, the researcher derives estimates of daily abnormal returns (AR) for the ith firm using the following equation:

$$AR_{it} = R_{it} - (a_i + b_i R_{mt}),$$

where a_i and b_i are the ordinary least squares (OLS) parameter estimates obtained from the regression of R_{it} on R_{mt} over an estimation period (T) preceding the event, for example, 250 to 50 days prior to the event. The abnormal returns (AR_{it}) represent returns earned by the firm after the analyst has adjusted for the "normal" return process. That is, the rate of return on the stock is adjusted by subtracting the expected return from the actual return. Any significant difference is considered to be an abnormal, or excess, return.

Following Dodd and Warner (1983), many authors compute a standardized abnormal return (SAR), where the abnormal return is standardized by its standard deviation:

$$SAR_{it} = AR_{it}/SD_{it},$$

with

$$SD_{it} = \{S_i^2 \times [1 + 1/T (R_{mt} - R_m)^2 / \sum_{t=1}^{T} (R_{mt} - R_m)^2]\}^{0.5},$$

where S_i^2 is the residual variance from the market model as computed for firm i, R_m is the mean return on the market portfolio calculated during the estimation period, and T is the number of days in the estimation period.

The standardized abnormal returns can then be cumulated over a num-

ber of days, k (the event window), to derive a measure of the cumulative abnormal return (CAR) for each firm:[1]

$$CAR_i = (1/k^{0.5}) \sum_{t=1}^{k} SAR_{it}.$$

A standard assumption is that the values of CAR_i are independent and identically distributed. With this assumption, we convert these values to identically distributed variables by dividing the CAR_i by its standard deviation, which is equal to $[(T - 2)/(T - 4)]^{0.5}$.

Thus, the average standardized cumulative abnormal returns across n firms ($ACAR$) over the event window can be computed as:

$$ACAR_t = 1/n \times 1/[(T - 2)/(T - 4)]^{0.5} \sum_{i=1}^{n} CAR_{it}.$$

The test statistic used to assess whether the average cumulative abnormal return is significantly different from zero (its expected value) is:

$$Z = ACAR_t \times n^{0.5}.$$

If significant, the cumulative abnormal return is assumed to measure the average effect of the event on the value of the n firms. That is, the significance of the abnormal return allows the researcher to infer that the event had a significant impact on the values of the firms.

Readers can be confident that the conclusions from an event study are valid only if they can be confident that the researcher has truly identified the abnormal returns associated with the event. The inference of significance relies on the following assumptions: (1) markets are efficient, (2) the event was unanticipated, and (3) there were no confounding effects during the event window.[2] Therefore, it is appropriate to use this method when these assumptions are likely to be valid. The third assumption is critical, because the method, by definition, attributes the abnormal return to the event under consideration. If other financially relevant events are occurring during the event window, it is difficult to isolate the impact of one particular event. In addition to these assumptions, several research design issues are important in implementing the event study methodology. The critical issues are (1) sample size, (2) nonparametric tests to identify outliers, (3) the length of the

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[1] Many authors do not report cumulative returns. Instead, they report daily returns (either standardized or unstandardized) and the associated t-statistics for the null hypothesis of a zero abnormal return.

[2] This is by no means an exhaustive set of issues. For example, there may be size and industry effects. Although the market model has its shortcomings, it is simply the best available model at this time. See Bromiley, Govekar, and Marcus (1988) for an excellent discussion of these issues and a critique of the event study methodology as a tool for measuring the impact of strategic decisions.

event window and justification of the length, (4) confounding effects, and (5) explanation of the abnormal returns.

To illustrate how these issues have been addressed in management studies, we summarize 29 recent event studies published in three top management journals, the *Academy of Management Journal* (*AMJ*), the *Strategic Management Journal* (*SMJ*), and the *Journal of Management* (*JOM*) in Table 1. The studies described are all of the event studies we could identify in these journals from 1986 through the spring of 1995. For each study, we report the topic addressed, the nature of the event, and how the authors handled the five critical research design issues. In the following sections, we draw on the data summarized in Table 1 to illustrate our arguments about the validity of assumptions and research design and implementation.

ASSUMPTIONS UNDERLYING IDENTIFICATION OF ABNORMAL RETURNS

Market Efficiency

The first assumption is that markets are efficient. A significant body of work in economics and finance has addressed the efficient markets hypothesis; in the management literature, Bromiley, Govekar, and Marcus (1988) summarized this work. Such attention is warranted because this assumption provides the basis for the use of the event study method. Market efficiency implies that stock prices incorporate all relevant information that is available to market traders. If this is true, then any financially relevant information that is newly revealed to investors will be quickly (instantaneously) incorporated into stock prices. Therefore, an event is anything that results in *new* relevant information. A researcher can identify significant events by their impact on the stock prices of firms. To do this, the researcher defines a period of days over which the impact of the event will be measured. This period is known as the event window.

The assumption of market efficiency is difficult to reconcile with the use of a long event window. The use of very long windows in many management studies implies that some researchers do not believe that the effects of events are quickly incorporated into stock prices. This can be interpreted as a violation of the assumption of market efficiency. In some circumstances, it may be reasonable to assume that information is revealed to investors slowly over a period of time. For example, when the event is an acquisition, information about the number of potential acquirers and their evaluation of the target may be revealed over a relatively long period. Where this is the case, it is the obligation of a researcher to explain why the effect would not be realized within a short period of time. Otherwise, the use of the event study method is inappropriate.

Unanticipated Events

The second assumption stated above is based on the idea that an event is announced in the press. The market previously did not have information

TABLE 1
A Summary of Recent Event Studies in the Management Literature, Sorted by Topic

Studies	Journal[a]	Topic[b]	Nature of Event(s)	(1) Sample Size(s)[c]	(2) Nonparametric Test for Outliers	(3a) Length of Event Window(s)	(3b) Justified Length of Window	(4) Checked for Confounding Effects	(5) Explained Excess Returns
Wright, Ferris, Hiller, and Kroll (1995)	AMJ	CSR	Labor department awards for exemplary affirmative action programs; firms found guilty of discrimination	$N = 35$, $n_1 = 34$	No	-10 to +10	No	No	No
Maxmar, Nigh, and Kwok (1994)	AMJ	CSR	Withdrawal from South Africa	$N = 39$, $n_1 = 19$	No	Various lengths from -30 to +10	No	Only on the days before and after the event	No
Clinebell and Clinebell (1994)	JOM	CSR	Plant closings	$N = 98$, $n_1 = 34$	No	-1 to +1, -5 to +5	No	Yes	Yes
Davidson and Worrell (1992)	SMJ	CSR	Product recall announcements	$N = 133$, $n_1 = 20$	No	Various lengths from -90 to +90	No	Only on the days before and after the event	No
Worrell, Davidson, and Sharma (1991)	AMJ	CSR	Major layoff programs	$N = 117$, $n_1 = 30$	No	Various lengths from -90 to 90	No	No	No
Davidson and Worrell (1988)	AMJ	CSR	Corporate illegalities	$N = 96$	No	Various lengths from -90 to +90	No	No	No
Worrell, Davidson, and Glascock (1993)	AMJ	CG	Firing and hiring of key executives	$N = 62$, $n_1 = 28$	No	Various lengths from -30 to +30	No	No	No
Davidson, Worrell, and Dutia (1993)	JOM	CG	CEO successions in bankrupt firms	$N = 81$, $n_1 = 28$	No	-5 to 0	No	No	No
Mahoney and Mahoney (1993)	SMJ	CG	Antitakeover amendments	$N = 409$, $n_1 = 23$	No	-50 to +10	No	No	No

TABLE 1 (continued)

Studies	Journal[a]	Topic[b]	Nature of Event(s)	(1) Sample Size(s)[c]	(2) Nonparametric Test for Outliers	(3a) Length of Event Window(s)	(3b) Justified Length of Window	(4) Checked for Confounding Effects	(5) Explained Excess Returns
Turk (1992)	JOM	CG	Managerial response to takeover bids	$N = 232$, $n_1 = 29$	No	-50 to $+5$	Yes	No	Yes
Chatterjee, Lubatkin, Schweiger, and Weber (1992)	SMJ	CG	(Cultural differences associated with) mergers and acquisitions	$N = 30$	Yes	-10 to $+5$	No	No	Yes
Markides (1992)	AMJ	CG	Corporate refocusing	$N = 43$	Yes	Various lengths from -10 to $+10$	No	Yes	Yes
Davidson, Worrell, and Cheng (1990)	JOM	CG	Executive successions	$N = 367$, $n_1 = 35$	No	Various lengths from -90 to $+90$	No	No	Yes
Seth (1990)	SMJ	CG	Corporate acquisitions	$N = 104$, $n_1 = 27$	No	-40 to $+5$	Yes	Yes	No
Lubatkin, Chung, Rogers, and Owens (1989)	SMJ	CG	CEO successions	$N = 471$	No	Various lengths from -50 to $+50$	Yes	No	Yes
Friedman and Singh (1989)	AMJ	CG	CEO successions	$N = 130$, $n_1 = 9$	No	-2 to $+2$	Yes	Yes	Yes
Shelton (1988)	SMJ	CG	Corporate acquisitions	$N = 218$	No	-1 to $+1$	No	No	Yes
Beatty and Zajac (1987)	SMJ	CG	CEO successions	$N = 209$, $n_1 = 25$	No	-30 to $+30$	No	Yes	No
Lubatkin (1987)	SMJ	CG	Mergers	$N = 340$, $n_1 = 36$	No	Various lengths from -18 to $+64$ months	No	No	No

TABLE 1 (continued)

Studies	Journal[a]	Topic[b]	Nature of Event(s)	(1) Sample Size(s)[c]	(2) Nonparametric Test for Outliers	(3a) Length of Event Window(s)	(3b) Justified Length of Window	(4) Checked for Confounding Effects	(5) Explained Excess Returns
Singh and Montgomery (1987)	SMJ	CG	Corporate acquisitions	$N = 77$ $n_1 = 37$	No	−5 to +100	No	No	No
Worrell, Davidson, Chandy, and Garrison (1986)	AMJ	CG	Deaths of key executives	$N = 127$ $n_1 = 43$	No	Various lengths from −90 to +30	No	No	No
Chatterjee (1986)	SMJ	CG	Corporate acquisitions	$N = 17$ $n_1 = 9$	No	−49 to +50	No	No	No
Koh and Venkatraman (1991)	AMJ	JV	Joint venture formations	$N = 175$	Yes	−1 to +1	Yes	Yes	Yes
Madhavan and Prescott (1995)	AMJ	JV	Joint venture formations	$N = 108$ $n_1 = 36$	No	Various lengths from −5 to +5	Yes	Yes	No
Jacobson (1994)	AMJ	LEG	Enactment of health care cost containment legislation	$N = 38$ $n_1 = 18$	No	−10 to +1	Yes	Yes	Yes
Nayyar (1993)	SMJ	MISC	Diversification moves by service firms	$N = 183$ $n_1 = 33$	No	−1 to +1	No	No	No
Nayyar (1995)	SMJ	MISC	Customer service changes (increases and decreases)	$N = 262$ $n_1 = 2$	Yes	−1 to +10	Yes	No	No
Woolridge and Snow (1990)	SMJ	INV	Strategic investment decisions	$N = 767$	No	Various lengths from −1 to +10	No	No	No
McGuire, Schneeweis, and Naroff (1988)	AMJ	MISC	Appointments of top managers to cabinet positions	$N = 93$ $n_1 = 22$	No	−30 to +30	No	Yes	No

[a] AMJ = Academy of Management Journal, SMJ = Strategic Management Journal, and JOM = Journal of Management.
[b] CSR = Corporate social responsibility, CG = corporate governance, JV = joint ventures, LEG = legislation, INV = investment, and MISC = miscellaneous.
[c] Sample sizes are for overall sample (N) and smallest subsample (n_1) if events are disaggregated.

on the event, and traders gain information from the announcement. Abnormal returns can then be assumed to be the result of the stock market's reacting to new information. It is possible that an event will have been anticipated or information leaked to the market in advance of a formal announcement. Such leakages make use of the event study methodology problematic, as it is difficult to determine when traders became aware of the new information. For example, information on corporate control changes and top-level management turnover may actually be revealed to the market before the events are officially announced (cf. Beatty & Zajac, 1987; Chatterjee, 1986; Mahoney & Mahoney, 1993; Turk, 1992; Seth, 1990). For other types of events commonly examined in the management literature, it may also be important to examine the validity of the assumption that the events were unanticipated. However, management researchers have rarely addressed this issue in studies that do not focus on corporate control issues.

Confounding Effects

The third assumption is based on the claim that a researcher has isolated the effect of an event from the effects of other events. This is perhaps the most critical assumption of the methodology. It is assumed that there are no confounding effects from other events. Confounding events can include the declaration of dividends, announcement of an impending merger, signing of a major government contract, announcement of a new product, filing of a large damage suit, announcement of unexpected earnings, and change in a key executive. Any of these events might have an impact on the share price during an event window. The longer the event window, the more difficult it is for researchers to claim that they have controlled for confounding effects. Management scholars do not appear to have been sensitive to this issue. The authors of many studies employing long windows have not stated whether they controlled for confounding effects.

RESEARCH DESIGN AND IMPLEMENTATION

Sample Size

Sample size is a concern because the test statistics used in the event study framework are based on normality assumptions associated with large samples. Unfortunately, small samples are quite common in the management literature, especially when events are disaggregated along many dimensions (see Table 1). When using a small sample, researchers are prudent to use "bootstrap" methods, which do *not* require the normality assumptions that are relied upon with large samples (Barclay & Litzenberger, 1988). An example of the application of bootstrap tests follows.

A researcher has computed daily average abnormal returns (*AR*) and the proportion of negative returns (*PRNEG*) for a sample of 15 firms over a 200-day estimation period (the period before the event that is used to estimate the parameters, α and β). Thus, 15 sets of 200 daily excess returns have been generated. One excess return from each of these 15 distributions is

randomly drawn and the *AR* and *PRNEG* are derived. The researcher repeats this process 3,000 times (15 × 200), providing bootstrap distributions of the *ARs* and *PRNEGs*. The significance tests for the *ARs* and *PRNEGs* are based on a comparison of their probability values with the bootstrap distribution:

$$\text{Probability value } (AR) = (number\ of\ ARs \leq AR_t)/3{,}000$$

and

$$\text{Probability value } (PRNEG_t) = (number\ of\ PRNEGs \geq PRNEG_t)/3{,}000.$$

These statistics should have been reported in several of the studies we examined. For example, Nayyar (1995) examined the abnormal returns associated with customer service changes involving only two companies. Jacobson (1994) examined the abnormal returns associated with health care cost containment legislation for samples of 18 and 20 firms. McGuire, Schneeweis, and Naroff (1988) used a sample of 22 firms to examine the effects of having a top manager appointed to a cabinet position. Clearly, in many instances imposing normality assumptions would be quite heroic. Given that the sample sizes are generally quite small, it is troubling that only 4 out of the 29 studies reported additional statistics on the distribution of abnormal returns (beyond the mean abnormal return) and none reported bootstrap tests.

Nonparametric Tests to Identify Outliers

The test statistics employed in event studies tend to be quite sensitive to outliers,[3] and a small sample magnifies the impact of any one firm's returns on the sample statistic. Hence, with small samples, interpretation of significance is problematic. It becomes crucial to assess whether the results are driven by outliers. In the management literature, authors have seldom identified outliers or adjusted the methodology to take their influence into account. However, it is clear that researchers should adjust the event study technique, or be especially careful to identify outliers, when dealing with small samples.

The identification of outliers raises the issue of what to do about them. Many researchers simply eliminate them from their samples, assuming that these data points reflect noise or measurement error. However, deleting outlying observations is a drastic approach. It is possible that outliers provide an important signal of the existence of confounding effects. One important control for outliers is for researchers to report nonparametric test statistics. One to include is the following binomial *Z* statistic, which tests whether the proportion of positive to negative returns exceeds the number expected from the market model:

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[3] The estimates of abnormal returns in event studies are based on OLS regressions. It is well known that least squares parameter estimates, based on a quadratic loss function, are highly sensitive to outliers. One solution to this problem, reported by Jacobson (1994: 446), is to identify influential outliers using measures proposed by Cook (1977, 1979).

$$Z_p = (PRNEG_t - p^\star)/[(p^\star)(1 - p^\star)/N]^{1/2},$$

where $PRNEG_t$ is the proportion of negative excess returns on day t, $p^\star$ is the expected value of $PRNEG_t$, and N is the number of firms (Kumar, Sen, & Shome, 1993).[4] A second nonparametric statistic to report is the Wilcoxon signed rank test, which considers both the sign and the magnitude of abnormal returns (Kohler, 1985).

Length of the Event Window

Possibly the most crucial research design issue is the length of the event window used in an event study. Many management studies are based on long event windows. There are two problems with this practice. First, as Brown and Warner (1980, 1985) showed, using a long event window severely reduces the power of the test statistic, Z_t. This reduction leads to false inferences about the significance of an event.

In addition, it has been empirically demonstrated that a short event window will usually capture the significant effect of an event (Ryngaert & Netter, 1990). For example, Dann, Mayers, and Raab (1977) found that the market price of a stock fully adjusts within *15 minutes* of the release of firm-specific information. Mitchell and Netter (1989) found that the stock market reacted within *90 minutes* of news wire stories announcing proposed federal tax legislation. Because it is much more difficult to control for confounding effects when long windows are used, an event window should be as short as possible. It should be long enough to capture the significant effect of the event, but short enough to exclude confounding effects.[5]

The nature of the event being studied should determine the length of the event window used (Ryngaert & Netter, 1990: 257). For example, where it can be shown that leakage of information is likely, the window should include some time prior to the announcement of the event so that abnormal returns associated with the leakage will be captured. In the absence of uncertainty about when information is actually revealed to the market, it is difficult to justify a long window. As noted earlier, the assumption of market efficiency implies almost instantaneous adjustment in stock price to the arrival of new information.

Table 1 shows that the event windows in management studies have generally been quite long. In fact, 181-day event windows (which means 181 *trading days,* or approximately nine months) are not uncommon! Only about one-quarter of the studies include justification of the lengths of the windows used. Those that have justified the length (e.g., Seth, 1990; Turk, 1992) have

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[4] The idea behind this test is that, if the event has no significant effect on shareholder returns, then abnormal returns will be normally distributed—that is, half the companies will experience positive abnormal returns and the other half, negative abnormal returns.

[5] Another reason to be concerned about long event windows is that an inherent assumption of this model is that the α and β terms remain constant during the event window. This assumption may be problematic with long event windows. Therefore, with very long windows, researchers should estimate pre-event and postevent parameters separately.

usually explained why leakages were expected. Many other studies, however, have reported multiple windows with no justification for any of the lengths used.

Confounding Effects

A second problem with using long event windows is that they greatly exacerbate the difficulty of controlling for confounding effects. Since many of the firms under examination are large, diversified, multinational firms, it is likely that significant events occur quite frequently. With a short event window, a researcher can be reasonably confident that an abnormal return is due to an event, because it is relatively easy to identify confounding effects. Because this methodology is based on the assumption that the researcher is calculating the returns that result from the event being studied, failing to control for confounding events causes serious doubts about the validity of the empirical results and calls into question any conclusions drawn.

For example, Meznar, Nigh, and Kwok (1994) reported that they checked for confounding effects during the 3-day window immediately surrounding their event. They found confounding events for 37 percent of the firms in their original sample and eliminated those firms from the sample estimated. They specifically did *not,* however, check for confounding events over any other window length, because doing so "would have eliminated so many events from the pool" (1994: 1639).[6] An examination of the results in Meznar and colleagues' publication shows that there were no significant abnormal returns during the 3-day window when confounding effects were controlled for. Only during longer (13-, 21-, 31-, and 41-day) windows, when confounding effects were *not* controlled for, did they find significant results.

There are methods that allow researchers to control for confounding events. Foster (1980) discussed several of them, such as (1) eliminating firms that have confounding events, (2) partitioning a sample by grouping firms that have experienced the same confounding events, (3) eliminating a firm from the sample on the day that it experiences a confounding event, and (4) subtracting the financial impact of the confounding effect when calculating the abnormal returns. In this regard, Salinger (1992) used a technique that subtracted the impact of confounding events in a study of the financial impact of the Bhopal disaster on Union Carbide.

Table 1 shows that many articles in management journals do not clearly state whether confounding events are controlled for.[7] It is possible that many

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[6] Meznar and colleagues stated that "the protection period selected represents an attempt to compromise between internal and external validity issues" (1994: 1639). This statement is inconsistent with the advice of Cook and Campbell, who cautioned that ". . . jeopardizing internal validity for the sake of increasing external validity usually entails a minimal gain for a considerable loss . . . internal validity is the *sine qua non* of causal inference" (1979: 84).

[7] One notable exception is Markides, who stated that he included only those firms for which "no major confounding announcements (earnings, dividends, share repurchases) were made within five days before or after the announcement day" (1992: 403).

researchers do control for confounding events but do not report this infor-
mation in their published articles. In Wright, Ferris, Hiller, and Kroll (1995),
the authors stated that they did check for confounding events; however, our
check of the *Wall Street Journal* index found 189 confounding events during
the reported windows for their two studies. Tables 3 and 4 list these con-
founding events, which are discussed in the section of this article on repli-
cation.

Explanation of Abnormal Returns

A final issue of note concerns explanation of abnormal returns. After
determining the significance of the CARs, in a second stage of the analysis,
a researcher should explain the abnormal returns by showing that the cross-
sectional variation in the returns across firms is consistent with a given
theory. For example, the theory may predict that there should a positive
correlation between the size of the abnormal return and the extent of firm
diversification. Thus, in the second stage of the analysis, the researcher
should regress the abnormal returns on some measure of firm diversification
and report the parameter estimates. For example, Friedman and Singh (1989)
regressed abnormal returns on several variables describing organizational
context and precursor events in a study of the effect of CEO succession.

Other management studies that have explained abnormal returns in-
clude Clinebell and Clinebell (1994), Jacobson (1994), Turk (1992), Chatter-
jee, Lubatkin, Schweiger, and Weber (1992), Markides (1992), Koh and Ven-
katraman (1991), Davidson, Worrell, and Cheng (1990), Lubatkin, Chung,
Rogers, and Owens (1989), and Shelton (1988). Demonstrating that the pat-
tern of abnormal returns is consistent with established theory, a standard
practice in other disciplines, lends considerable credibility to the empirical
findings of a study.[8]

We also see from Table 1 that few of the published works contain an
explanation of the abnormal returns. In the management literature, some
researchers have not even predicted a priori the *direction* of the effect of
events. For example, in a study examining layoff announcements, the au-
thors stated that "we believed that such reactions will generally be negative,
but they could be positive or neutral" (Worrell, Davidson, & Sharma, 1991:
664). And, in an article examining the effect of having a top corporate man-
ager receive a cabinet appointment, McGuire and colleagues (1988) surmised
that the event "may be detrimental of the stock market returns" or "may . . .
raise the value of the firm's stock" or "may have little effect on a firm's
market value" (1988: 202). Where there is no underlying theory to test, it is
not surprising that excess returns are not explained.

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[8] A reviewer noted that there may be a problem with using the abnormal returns as depen-
dent variables in an OLS regression, because they are essentially residuals that may be het-
eroskedastic and correlated with the independent variables. However, Karafiath (1994) showed
that the OLS estimator performs surprisingly well under these conditions and that there appears
to be little benefit in using more complex estimation procedures.

Having outlined the assumptions of the model and the important re-
search design issues, we examine three recently published event studies that
tested theories of corporate social responsibility.

REPLICATIONS OF SELECTED EVENT STUDIES

Event Studies of Corporate Social Responsibility

The issues discussed above may be particularly significant in the area of
corporate social responsibility (CSR). This is an area in which researchers
desire to have an impact on public policy decision making, but it has been
difficult for them to do so because of the problems involved in measuring the
impact of managerial decisions. The primary model that has emerged in this
area is stakeholder theory (Donaldson & Preston, 1995). According to stake-
holder theory, implementing socially responsible decisions involves a trade-
off. The trade-off is between profit enhancement (for the benefit of stock-
holders) and something of benefit to other stakeholders. This posited rela-
tionship has led some researchers to infer that the impact of socially
responsible decisions can be estimated by examining their effect on stock
prices. The presumed importance, and ease of determination, of stock prices
may explain why researchers have used the event study methodology to test
theories pertaining to corporate social responsibility.

Several of the articles in our sample, reported in Table 1, deal with CSR.
The issues examined include affirmative action programs (Wright et al.,
1995); discrimination suits (Wright et al., 1995); withdrawal from South
Africa (Meznar et al., 1995); plant closings (Clinebell & Clinebell, 1994);
product recall announcements (Davidson & Worrell, 1992); layoff programs
(Worrell et al., 1991); and corporate illegalities (Davidson & Worrell, 1988).
In all of these articles, the researchers inferred from their empirical results
that the events being studied had significant impacts on the stock prices of
the firms and that those findings supported some aspect of stakeholder
theory.

We reexamined three corporate social responsibility hypotheses from
two publications, Nigh, Meznar, and Kwok (1994) and Wright, Ferris, Hiller,
and Kroll (1995), to see if the research designs the authors employed mate-
rially affected the conclusions they drew. We selected these studies because
they were the most recent corporate social responsibility studies using the
event study method that had appeared in *AMJ.* Because the authors were
willing to provide firm names and dates, we were able to reanalyze the data
using an alternative research design.[9] The research design issues that we
focused on in this analysis were the length of the event windows used and
the presence of confounding effects. For each of these studies, we estimated
2-, 3-, 5-, and 11-day windows as well as the longest window reported

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[9] It is interesting to note that the paper by Wright and colleagues is the only management
study to provide firm names and event dates in the text.

in each study. For each window, we eliminated firms for which there were confounding effects, defined as other economically relevant events. These were events reported in the *Wall Street Journal* during the event window.

Empirical Issues

Tables 2, 3, and 4 list the confounding events that fell within the longest window, by firm, for the firms in the three studies. Column 1 in these tables lists the firm name (for those firms for which we found confounding events), column 2 contains the event date, and the remaining columns contain the dates of the confounding events. The column headings for columns 3 through 13 define the confounding events.

We identified 178 confounding events for the Meznar et al. sample of firms that withdrew from South Africa, 69 for the Wright et al. sample of firms thàt received awards for exemplary affirmative action programs, and 120 for the Wright et al. sample of firms that were found guilty of discrimination. These 367 confounding events included major executive changes (17), restructuring or divestitures (29), acquisition activity (39), joint ventures (18), major litigation or labor unrest (43), forecasted changes in sales or earnings (32), major contracts (34), and announcements of earnings or dividends (78). All of these events have been shown to generate significant abnormal returns (Becker, 1987; Becker & Olson, 1986; Hite & Owers, 1983; Kalay & Loewenstein, 1985; Kaplan & Weisbach, 1992; McConnell & Nantell, 1985; McWilliams, Turk, & Zardkoohi, 1993; Reinganum, 1983; Rogerson, 1989).

Many of these confounding events were quite noteworthy. During the event window for the Meznar and colleagues study, we found Allegis fighting a battle with the pilots' union for control of the company; Pepsi reacting to the introduction of New Coke; Revlon engaged in a hostile takeover battle; Unisys involved in a major corruption scandal; Apple losing its founder-CEO, Steve Jobs; and a substantial number of earnings and dividend announcements. During the event window for Wright and colleagues' study of affirmative action award winners, we found Polaroid announcing a new film on the day of the event studied; McDonnell Douglas receiving a $298 million contract on the day of the "event" and three additional large contracts during the window; Scott Paper's earnings announcement on the day of the "event"; Tenneco entering a major reorganization; EG&G announcing a dividend increase; and Philip Morris attempting to sell 7-Up. During the event window for the Wright and colleagues' study of firms found guilty of discrimination, we found Northwest Airlines' entry into a price war on the day of the "event"; a strike at USX; Pan Am's attempt to avert a strike; General Motors announcing plant shutdowns, a strike, and a confrontation with Ross Perot; and Apple reporting a decline in earnings and expected future earnings.

It is interesting that the affirmative action awards, whose announcements were the events studied, do not seem to have been noteworthy to the financial community. In fact, none of these awards was reported in the *Wall*

TABLE 2
Confounding Events Occurring during Meznar, Nigh, and Kwok's Longest Event Window[a]

Company Affected	Event Date	Restructuring/ Divestiture	Price Changes	New Products	Dividend/ Earnings Announcements	Joint Venture	Acquisition Activity	Litigation/ Labor Unrest	Major Executive Changes	Major Initiatives by Rivals	Forecasted Changes in Earnings or Sales	Layoffs	Debt or Equity Related Event	Contract Awards
Allegis	8/24/87				7/31		7/27, 8/14, 4/9	7/31						8/27
American Brands	5/01/87	5/7											5/12	
Apple	8/05/85	6/27		7/9									8/2	
Ashland	10/29/86				10/23, 11/7						7/25, 8/16		11/4	
BBDO	8/21/85				7/24, 8/27						11/8			
Black and Decker	1/17/87				1/27				12/22				1/27	
Bundy	12/09/86				11/25									
Chase Manhattan	8/01/85				7/16, 7/23		7/3, 7/24, 8/2		7/25					
Control Data	11/11/88	10/10, 11/16			10/25, 11/15						11/14	10/10		11/7, 10/31
CPC International	4/03/87	3/25, 4/2			3/18, 4/13						4/13			
Dow Chemical	2/14/87		2/3, 2/4		1/30				2/6	1/22, 1/28, 2/3				
Dun & Bradstreet	12/10/86	11/3, 12/18												
Eastman Kodak	11/20/86				11/13, 11/17	10/17, 11/25, 11/6	11/18				11/13		11/24	
Emery Air	7/02/87								6/2					
Exxon	12/30/88	12/11, 12/12, 12/23									12/11			
Federal Mogul	9/16/88				9/29									
Firestone	5/19/87	5/15			5/22			5/5, 5/15			5/1			
Fluor	12/06/88	10/14			12/10									11/25
Foster Wheeler	2/23/87				1/27, 2/24, 5/3	1/20								
Goodyear	6/08/89							5/12						
IBM	10/22/88	9/12	9/19, 9/24, 10/7, 10/8		10/14	10/7			10/29, 10/30	10/2, 10/3, 10/23, 10/27	10/6, 10/8	10/9		9/11
International Harvester	8/31/85				8/16	9/13						8/19		
Johnson Controls	11/24/86				11/28, 10/31									

TABLE 2 (continued)

Company Affected	Event Date	Event Type — Restructuring/Divestiture	Price Changes	New Products	Dividend/Earnings Announcements	Joint Venture	Acquisition Activity	Litigation/Labor Unrest	Major Executive Changes	Major Initiatives by Rivals	Forecasted Changes in Earnings or Sales	Layoffs	Debt or Equity Related Event	Contract Awards
McGraw-Hill	2/27/87				1/29, 2/3									
Motorola	10/09/85				10/14				1/22			10/2		10/1, 10/11
NCNB	2/20/85				1/21		1/14							
NCR	4/05/89				4/18									
Newmont Mining	3/31/88	4/5	3/22										3/23	
Norton	3/04/87				2/13, 3/2		1/27							
Pepsi	5/19/85	5/18, 5/21	5/21		4/26, 5/2		4/30	4/30, 5/21		4/23, 4/24, 5/6, 5/18	5/22		5/2	
Perkin Elmer	2/26/85			2/5	2/20, 2/22									2/5
Procter & Gamble	9/26/86				7/28, 7/31			9/5			10/2			
Raychem	8/29/89						11/14, 11/17, 11/18, 11/19, 11/20, 11/26, 11/26	10/29, 11/28, 12/3						
Revlon	12/05/86													
Square D	2/27/87				1/29, 2/27	2/2, 3/3								
Stanley Works	5/05/86				4/17									
Tambrands	11/28/87				10/26, 10/29									
Unisys	8/20/88		8/30		7/15		8/11	7/13, 7/13, 7/15, 7/20	7/20					7/15, 7/25, 8/31
Westinghouse	3/13/87					2/2, 3/3	1/30, 2/7, 2/10		3/11		2/5	2/2		2/10, 3/16, 3/19
Totals (178)		(17)	(9)	(2)	(46)	(8)	(21)	(16)	(9)	(11)	(13)	(5)	(7)	(14)

^a The window lasted from day −30 through day +10.

TABLE 3

Confounding Events Occurring during Wright, Ferris, Hiller, and Kroll's Longest Event Window for Affirmative Action Awards[a]

Company Affected	Event Date	Restructuring/ Divestiture	Price changes	New Products	Dividend/ Earnings Announcements	Joint Venture	Acquisition Activity	Litigation/ Labor Unrest	Major Executive Changes	Major Initiatives by Rivals	Forecasted Changes in Earnings or Sales	Layoffs	Debt or Equity Related Event	Contract Awards
Glaxo	9/17/92			9/4	9/11, 9/15									
Motorola	9/17/92			9/9		9/23								
Pfizer	9/17/92			8/24		9/15								
Society Corp.	9/17/92						9/22							
Anheuser Busch	9/19/91											9/17		
Polaroid	9/18/91			9/19										
Tenneco	9/19/91	9/12			9/12									
Marriott	10/23/90	10/12											10/12, 10/15	
Potomac Electric	10/23/90				10/29									
Schering Plough	10/23/90				10/19, 10/24			10/10						
U.S. West	10/23/90				10/19	10/23								
Westinghouse	10/23/90				10/11		10/31							10/24
Barnett Banks	12/18/89			12/8, 12/14							12/13			
Procter & Gamble	12/18/89						12/14	12/28			12/5			
Southern New England Telecom	12/18/89				12/13									
Texas Instruments	12/18/89	12/19												12/27
Allied Signal	11/15/88			11/2								11/14		11/21, 11/23
Duke Power	11/15/88											11/10		
EG & G	11/15/88						11/2							
McDonnell Douglas	11/15/88	11/1			11/23									11/15, 11/16, 11/17, 11/22
Quaker Oats	11/15/88				11/10		11/10					11/3		
Syntex	11/15/88				11/22									
Scott Paper	7/22/87			7/23	7/22									
Xerox	7/22/87				7/14, 7/24		7/15							
Bank of America	7/09/86				7/17									
General Mills	7/09/86	7/23			6/24, 7/11									
Johnson & Johnson	7/09/86				7/22, 7/24									
Raytheon	7/09/86				6/26, 7/11		6/26				7/7			
Phillip Morris	7/09/86	6/25, 7/14			7/18			7/16, 7/22						
Totals (88)		(7)	(0)	(8)	(23)	(3)	(7)	(4)	(0)	(0)	(3)	(4)	(2)	(8)

[a] The window lasted from day −10 through day +10.

TABLE 4
Confounding Events Occurring during Wright, Ferris, Hiller, and Kroll's Event Window for Firms Found Guilty of Discrimination[a]

Company Affected	Event Date	Restructuring/ Divestiture	Price Changes	New Products	Dividend/ Earnings Announcements	Joint Venture	Acquisition Activity	Litigation/ Labor Unrest	Major Executive Changes	Major Initiatives by Rivals	Forecasted Changes in Earnings or Sales	Layoffs	Debt or Equity Related Event	Contract Awards
Coca-Cola	9/24/92			9/29										
IBM	7/08/92	6/25		7/10, 6/22	7/20	6/22, 7/2, 7/7, 7/13, 7/14		6/25, 6/29, 7/15		6/28	9/23, 9/28 6/22 7/13, 7/17			6/23
Apple Computer	4/22/91		4/10		4/16			4/10, 4/17		5/3	4/19, 5/1, 5/2			
Northwest Airlines	8/19/91		8/19, 8/20, 8/22		8/12		8/22	8/8		8/13				
Southwestern Bell	11/04/91					11/14								
USX	2/27/81							2/19, 3/1						
General Electric	10/04/89				10/13			10/13	9/28					9/25, 9/29 10/2, 10/5 10/9, 10/12

TABLE 4 (continued)

Company Affected	Event Date	Restructuring/ Divestiture	Price Changes	New Products	Dividend/ Earnings Announcements	Joint Venture	Acquisition Activity	Litigation/ Labor Unrest	Major Executive Changes	Major Initiatives by Rivals	Forecasted Changes in Earnings or Sales	Layoffs	Debt or Equity Related Event	Contract Awards
Pan Am	2/04/88							2/4	1/22					
CBS	8/05/87							8/14	8/17					
Con Agra	9/04/87						9/11		8/28	8/17	9/17			
General Motors	4/08/87			4/9				3/26, 3/30, 4/6	4/7		4/3, 4/6, 4/13, 4/16		4/3, 4/14	3/28, 4/14, 4/17
3M	7/27/87				7/23				7/22					7/21, 7/23
Anheuser Busch	5/15/86						5/7, 5/12					7/2		
Chase Manhattan	2/21/86	2/20, 3/6							3/5	5/27				
Du Pont	7/10/86	6/30					7/9, 7/21					7/2	7/22	
Ford Motor Company	5/02/86		4/22, 5/5	4/18	4/25			4/18, 5/12		5/15	4/21, 5/14		4/28	
Goodyear	5/21/86				5/7, 5/9									
Pacific Telesis	12/05/86						12/10				12/3			
TWA	8/20/86										8/9			
United Airlines	7/02/86						7/2, 7/8, 7/11, 7/14	6/24	6/12					
USX	8/05/86		8/19		7/30			7/22, 7/25, 7/28, 7/29, 8/1, 8/4, 8/5		8/8, 8/11, 8/12			7/24	
Westinghouse	3/28/88	3/26				3/28		4/2						
Totals (120)		(5)	(7)	(5)	(9)	(7)	(11)	(25)	(8)	(8)	(18)	(2)	(5)	(12)

a The window lasted from day −10 through day +10.

Street Journal. This is notable because the *Wall Street Journal* is considered the newspaper of record for financially relevant events.

It is also interesting to note that the authors of the studies we reexamined claimed quite dramatic value effects. Meznar and colleagues' stated that "by day 10, the stocks of the studied firms were, on the average, almost 5.5 percent lower than they would have been had the firms not withdrawn from South Africa" (1994: 1641). If this inference is legitimate, it indicates that managers' socially responsible actions can be quite costly for stockholders. Most of the firms in these studies were very large in terms of employment, geographic scope, and market value (which was generally in the billions of dollars). A decline of 5.5 percent would thus represent an *average* drop in value in the hundreds of millions of dollars. Alternatively, a positive cumulative abnormal stock return of 1 percent (Wright et al., 1995) would increase value by millions of dollars ($100 million for a $10 billion firm).[10] Thus, the rewards for managers whose compensation is tied to stock price return would be quite enticing. The size of these reported effects warrants further examination and consideration of the empirical and theoretical problems associated with using event studies to test CSR theory.

We reexamined each of the three studies using both short and long windows. Table 5 presents our results. Several things are worth noting. After we controlled for confounding events, the magnitudes of the abnormal returns were greatly diminished for all windows. More importantly, after controlling for confounding events, we found that the abnormal returns for all three studies were *all* statistically insignificant. Not surprisingly, eliminating confounding events dramatically reduced the sample size, especially for the long windows.[11] For the Meznar et al. study, the sample size was reduced to zero for the longest window. That is, for a 41-day window, all of the firms had at least one confounding event. For the Wright et al. award winners, the sample for the longer window (21 days) was reduced to 5 firms, and for the firms found guilty of discrimination, the sample was reduced to 13 firms. We also report (in the last column) the proportion of negative excess returns, which is an important nonparametric statistic, especially for a small sample. We tested whether these proportions were significantly different from their expected values. In all instances, these test statistics were insignificant.

Our conclusion is that we find no support for the hypothesis that the

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[10] In an earlier paper that also used the event study methodology to test the effects of these same affirmative action awards, Hiller and Ferris speculated that the financial rewards may be a result of the "promotion of good management techniques [including] increasing opportunities, attracting talented individuals, removing artificial barriers, encouraging diverse opinions, and learning to deal effectively with different personalities" (1993: 797).

[11] Although Wright and colleagues reported that they "scanned these sources [the *Wall Street Journal Index* and the *Dow Jones News Retrieval Service*] for the 90 days before and after each occurrence to identify the occurrence of other, economically relevant events" (1995: 277), we found a total of 189 economically relevant events reported in the *Wall Street Journal* during the two 21-day windows they reported.

TABLE 5
Cumulative Abnormal Returns for Meznar, Nigh, and Kwok and Wright, Ferris, Hiller, and Kroll before and after Controlling for Confounding Events[a]

	Before			After				
Intervals	CAR	Z	N	CAR	Z	N	PRNEG[b]	Z_p[c]
(a) Meznar, Nigh, and Kwok (1994): Effects of Withdrawal from South Africa								
−1 to 0	−.0005	−0.28	39	−.0005	−0.28	39	52.6	0.08
−1 to +1	−.0039	−0.65	39	−.0026	−0.45	32	53.1	0.02
−2 to +2	−.0057	−0.94	39	+.0022	+0.62	29	51.7	0.01
−5 to +5	−.0243	−2.68**	39	−.0103	−0.86	19	58.4	0.05
−30 to +10	−.0546	−2.58**	39	n.a.	n.a.	0	n.a.	
(b) Wright, Ferris, Hiller, and Kroll (1995): Effects of Affirmative Action Awards								
−1 to 0	+.0048	n.r.	34	+.0008	+0.21	28	48.2	−0.04
−1 to +1	+.0098	n.r.	34	+.0004	+0.08	22	51.5	0.04
−2 to +2	+.0108	n.r.	34	−.0024	−0.32	18	52.2	0.02
−5 to +5	+.0106	n.r.	34	−.0117	−0.77	11	58.7	0.46
−10 to +10	+.0118	+1.54	34	−.0343	−1.14	5	56.2	0.34
(c) Wright, Ferris, Hiller, and Kroll (1995): Effects of Being Found Guilty of Discrimination								
−1 to 0	−.0037	n.r.	35	+.0074	+1.37	24	56.3	0.33
−1 to +1	−.0047	n.r.	35	+.0023	+0.31	21	60.3	0.68
−2 to +2	−.0046	n.r.	35	−.0002	−0.02	15	60.0	0.53
−5 to +5	−.0028	n.r.	35	−.0068	−0.36	12	63.6	0.73
−10 to +10	−.0017	−1.12	35	−.0040	−0.14	11	58.0	0.45

[a] Data are reported to the fourth decimal place because it is critical to have units of measurement that are as detailed as possible. This is necessary because even small changes in share prices for companies with billions of dollars in market value may constitute a large financial impact. The entry n.a. = not applicable; n.r. = not reported.

[b] *PRNEG* = percentage of cumulative abnormal returns.

[c] Z_p = binomial z statistic for testing the significance of the proportion of negative cumulative abnormal returns.

** $p < .01$

announcement of these socially responsible decisions had an impact on the stock prices of firms. We do not conclude that this is evidence that socially responsible decisions have no impact on the stock price (or performance) of a firm. Our conclusion is that we cannot infer, on the basis of this technique, that stockholders benefit or are harmed by decisions that may reflect corporate social responsibility. This is not surprising, because most of the firms examined in these studies are large, diversified companies, whose managers frequently make important decisions, making it difficult to isolate the effect of any one decision.

Our results clearly demonstrate that event studies of corporate social responsibility may be quite sensitive to research design issues, especially the length of the event windows used and confounding economically relevant

events.[12] This sensitivity is important because most of the CSR studies reported in Table 1 have long windows (including three with 181-day windows) and because most of the authors did not report controlling for confounding events throughout those windows. In fact, only one CSR study (Clinebell & Clinebell, 1994) had a relatively short window and appropriate controls for confounding events during the entire window.[13] Given that we have demonstrated that there are no statistically significant effects in the three studies we replicated, the implication is that these issues should be taken into account in designing and reviewing event studies.

Theoretical Issues

There are also theoretical concerns with the use of this methodology. An analysis of stock price effects may not be the most appropriate method for testing the impact of corporate social responsibility. Using the event study method implies that such behavior can be recognized by its stock price effect, which is interpreted as a proxy for economic performance (and a measure of shareholder wealth). Two contrary views of the impact of socially responsible decisions emerge from the studies we replicated. These alternatives can be stated as propositions:

> *Proposition 1. Socially responsible behavior has a negative impact on economic performance (and stockholder wealth), constituting a redistribution of benefit from a firm's shareholders to other stakeholders (Meznar et al., 1994).*

> *Proposition 2. Socially responsible behavior both enhances economic performance (and stockholder wealth) and creates benefits for other stakeholders and thus produces social gains. Similarly, socially irresponsible behavior decreases performance, as well as creating harm for other stakeholders (Wright et al., 1995).*

It is important to note that a methodology based on an examination of the stock price effects of corporate social responsibility alone does not allow us to discriminate between these two views. For example, showing that affirmative action awards lead to higher stock prices does not prove that there is no redistribution from other stakeholders. Consumers could be bearing the cost of the affirmative action programs, or there might be redistribution of benefits from workers to stockholders. Therefore, event study results do not enable a researcher to conclude that the second view is correct if the first view is incorrect. A similar conclusion can be drawn from an event study

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[12] A good illustration of this sensitivity to research design is Posnikoff's (1997) study. She found a *positive* and significant stock price effect for firms withdrawing from South Africa, while Meznar and colleagues found a negative and significant effect for the same event.

[13] Clinebell and Clinebell also used a relatively large sample and explained the excess returns generated.

finding that withdrawal from South Africa decreased shareholder wealth. Withdrawal may not have created net benefits for other stakeholders, as many who opposed divestiture argued (Meznar et al., 1995: 1636–1637).

To test these propositions, a researcher should measure the impact of socially responsible decisions on other stakeholder groups. For example, if a researcher wanted to present evidence that there is a net social gain to affirmative action programs, a more direct approach would be to measure (1) the efficiency (total factor productivity) of firms before and after the start of these programs and (2) the impact of these programs on other stakeholders such as employees, consumers, and communities.

These concerns have been addressed in other areas of research in which event study methodology is used extensively. For example, a large body of empirical evidence on the combined market values of acquiring and acquired firms suggests that takeovers have a positive net effect on stockholder wealth (Jensen & Ruback, 1983). This finding is often cited as evidence that these transactions are socially desirable, because the market reaction is ostensibly consistent with the view that firms are more efficient after these events occur. However, even if takeovers create shareholder value, researchers should also consider whether these gains are the result of increased efficiency, or merely transfers from one stakeholder group to another. For example, Shliefer and Summers (1988) hypothesized that takeovers may have harmful effects on other stakeholders through layoffs, plant closings, lower wages, unexpected reductions in orders for suppliers, and lower tax revenues.

Viewed from this perspective, shareholder gains may be offset by losses to other corporate stakeholders, resulting in a net social loss. For example, Hitt, Hoskisson, Ireland, and Harrison (1991) demonstrated that acquisitions reduced the intensity of R&D investment at the firm level, which may lead to lower social welfare. Lichtenberg and Siegel (1987, 1990), using plant-level analysis, examined the impact of takeovers on total factor productivity, capital expenditures, plant closures, and wages. They found that changes in ownership resulted in higher plant-level productivity, without accompanying declines in capital expenditures or in wages for blue-collar workers and without increases in plant closures. In an analysis of individual workers, Gokhale, Groshen, and Neumark (1995) found that hostile takeovers led to employment and wage reductions for older workers. Considered together, the results of these studies demonstrate that examining stock price alone is not an appropriate way to assess net social benefits, and, by implication, not the best way to test corporate social responsibility. We propose that a more desirable methodological approach is to examine the net, or social, effects of decisions viewed as representing CSR. Doing so involves simultaneously measuring effects on firm performance and benefits or losses experienced by other stakeholder groups.

An additional caveat regarding the use of event studies is that the use of this methodology constrains researchers to an analysis of a strictly firm-level measure of performance. This constraint may be problematic when manag-

ers engage in socially responsible behavior that influences only a particular plant or unit of a firm. For example, affirmative action awards are often given to individual plants or divisions of firms such as General Electric, which has thousands of plants worldwide. Although the impact of an award may be quite significant at the plant level, it might be negligible at the firm level. This fact biases the analysis *against* showing an impact to these types of decisions. Therefore, behavior that should be encouraged and that could have a firm-level impact if practiced in multiple plants or units may go unrecognized and unrewarded. When examining plant-level or divisional decisions or outcomes, researchers need to use alternative methods, such as those discussed above.

DISCUSSION

The event study framework provides a true measure of the financial impact of an event only if a set of assumptions regarding the nature of the empirical experiment is valid and if the research design is properly executed. The crucial assumptions are that: (1) markets are efficient, (2) the event was unanticipated, and (3) there were no confounding effects during the event window. Our examination of 29 recent studies in top management journals leads us to conclude that management articles often do not provide enough information to allow readers to judge whether these assumptions are valid. Management studies rarely address the issue of market efficiency, but they often employ very long windows. These windows imply that their authors believe market adjustment to new information is not immediate—or even quick. Few management studies, except those examining changes in corporate control, include discussions of whether events were anticipated. However, several have windows that extend backward for several weeks before their events. Again, the use of long windows has implications—in this case, that the events may have been anticipated. Finally, it appears that few management studies report checking for confounding events. With long windows, it is highly likely that firms have experienced confounding events.

In addition to the above assumptions, several research design issues are critical to the proper implementation of this method. These include sample size, identification of outliers, length of the event window, confounding effects, and explanation of the abnormal returns. Our replication of three recent studies demonstrates that these issues have not been uniformly addressed in management studies, particularly in the area of corporate social responsibility research.

Sample sizes as small as two firms have been reported. None of the articles that reported results for small samples reported using bootstrapping techniques or identified outliers and discussed their impact on results. Many studies employed unusually long windows without justifying their length. For example, Davidson and Worrell (1988) used a 181-day window in a study of the effects of firms' being found guilty of illegal acts; McGuire and colleagues (1988) used a 61-day window in a study of appointments of top

managers to cabinet positions; and Meznar and colleagues used a 41-day window in a study of withdrawal from South Africa. Several studies in our sample did justify the use of long windows, including Turk (1992), Seth (1990), Lubatkin et al. (1989), Madhavan and Prescott (1995), Jacobson (1994), and Nayyar (1995).

Most of the studies identified in Table 1 did not report checking for confounding events. Only 11 of the 29 studies reported such a check, and of these, 2 checked only on the days before and after the event, not for the entire window. Only 10 of the 29 studies reported an explanation of the distribution of abnormal returns, and not all of these included an econometric test of the explanation.

Our replication of 3 recent studies demonstrates that these issues matter. Upon replicating the studies using appropriate research design and implementation techniques, we found that our results differed from those presented in the published studies. Although the authors reported significant results for all of the studies, we found that none of them had significant results for a short window immediately surrounding the event. Therefore, our conclusions differed significantly from those published. We found no support for the hypothesis that decisions based on corporate social responsibility had an impact on stock prices. We also noted that this methodology may not be appropriate for testing theories of CSR, because it is important to consider the impact of such decisions on multiple stakeholders, not just shareholders.

On the basis of our examination of existing studies, we conclude that there does not appear to have been a great deal of sensitivity to important design and implementation issues in event studies in management journals. Given the paucity of information on the validity of the assumptions underlying choice of the method and the research design used to implement it, readers cannot be confident that researchers have drawn the correct inferences about the significance of events. To ensure that design, implementation, and reporting are appropriate and sufficient, we suggest that researchers and journals consider the following recommendations for future event studies.

RECOMMENDATIONS

In Exhibit 1, we outline the appropriate procedures for an event study. The first step is to determine when it is appropriate to use the event study method. When an event is likely to have a financial impact, is unanticipated by the market, and provides new information to the market, it is appropriate to use the method. The second step is to outline a theory that justifies a financial response to this new information. This step would include the *a priori* prediction of the sign of the effect, based on the theory outlined. The third step would be to identify the event's dates and a set of firms that experienced the event.

The fourth step would be to choose an appropriate event window. For

EXHIBIT 1
Steps for Implementing an Event Study

Step 1: Define an event that provides new information to the market.
Step 2: Outline a theory that justifies a financial response to this new information.
Step 3: Identify a set of firms that experience this event and identify the event dates.
Step 4: Choose an appropriate event window and justify its length, if it exceeds two days.
Step 5: Eliminate or adjust for firms that experience other relevant events during the event window.
Step 6: Compute abnormal returns during the event window and test their significance.
Step 7: Report the percentage of negative returns and the binomial Z or Wilcoxon test statistic.
Step 8: For small samples, use bootstrap methods and discuss the impact of outliers.
Step 9: Outline a theory that explains the cross-sectional variation in abnormal returns and test this theory econometrically.
Step 10: Report firm names and event dates in data appendix.

events that were clearly unanticipated and that took place on the date identified, the appropriate window should be very short, from 1 to 2 days. For an unanticipated event, the first day on which the market can trade on the information is the event day itself. For example, the crash of an airplane is an unanticipated event. The news of the crash is released quickly, and the market can be expected to react very quickly if the news is judged to be relevant information. The window for this event would be 1 day (assuming this is a trading day). Most news items are given to the *Wall Street Journal* the day before they appear in print. Therefore, some traders may receive information on a given event the day prior to its public announcement. For such events, trading may take place the day before the event. Because a researcher may not be able to identify when the news was released, the standard event window is 2 days, the day of the event and the day prior to it, assuming these are trading days.

If a window exceeds the standard 2-day length, it should be justified. For example, an event might be the announcement of an acquisition, such as the takeover of First Interstate by Wells Fargo. Because takeovers usually result from a strategic planning process, the information of the impending merger may have been leaked to or predicted by some traders. In this instance, a window that included the planning period before the merger might be justified. Researchers should include this justification, including an explanation of the length chosen, in their text. Windows that extend beyond the event date should be justified in terms of uncertainty about the impact of the event. For example, traders might view an announcement of an intent to engage in a hostile takeover with some skepticism. The final outcome would be viewed as having some probability greater than 0 but less than 1. In this circumstance, the "news" may come in pieces as the developments of the negotiation take place (cf. Salinger, 1992).

The fifth step would be to eliminate firms from a sample if other events

financially relevant to them occurred during the chosen window. Relevant events include such things as unexpected dividend or earnings announcements, takeover bids, merger negotiations, changes in key executives, restructuring, joint ventures, major contract awards, significant labor disputes, significant liability suits, and announcements of major new products. When long windows can be justified because of uncertainty about when information was revealed, techniques can be used to control for confounding events. Foster (1980) and Salinger (1992) describe these. Such techniques are to be used only when longer windows are necessary and properly justified, however.

The sixth step is for researchers to compute the daily (or cumulative) abnormal returns accrued during the event window, using the standard methodology that we outlined in the Methods section of this article, and to test the significance of the abnormal return. The seventh step is to report the percentage of negative returns and the binomial Z or the Wilcoxon test statistic, or both. The eighth step is to include additional information if a sample of fewer than 30 firms was employed. This additional information includes the identification and measurement of the influence of outliers and the results of bootstrapping techniques. The ninth step is to outline a theory that explains the cross-sectional variation in abnormal returns and to test this theory econometrically. Finally, the last step is to report firm names and event dates in a data appendix, to facilitate replication and extension. It is important to note that some of the researchers whose studies we have included in our sample may have followed these procedures. However, this information was not reported, at least in the published versions of the articles.

Careful implementation will lead to results that can be confidently interpreted. The results, if statistically significant, provide an estimate of the average abnormal return (as a percentage of stock price) for a firm that experienced the event in question during the sample time period. By multiplying the abnormal return by the stock price and number of outstanding shares, researchers can estimate the overall financial impact of an event. When the event is the result of a managerial decision, the effect of this decision on the value of the firm can be inferred. Therefore, the methodology is a powerful tool for assessing managerial decisions and for prescribing the course of managerial behavior, if it is the result of a well-designed and well-executed empirical analysis.

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RESEARCH NOTES

CORPORATE SOCIAL PERFORMANCE AND ORGANIZATIONAL ATTRACTIVENESS TO PROSPECTIVE EMPLOYEES

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Drawing on propositions from social identity theory and signaling theory, we hypothesized that firms' corporate social performance (CSP) is related positively to their reputations and to their attractiveness as employers. Results indicate that independent ratings of CSP are related to firms' reputations and attractiveness as employers, suggesting that a firm's CSP may provide a competitive advantage in attracting applicants. Such results add to the growing literature suggesting that CSP may provide firms with competitive advantages.

Many scholars and practitioners today are paying increasing attention to firms' corporate social performance (CSP), a construct that emphasizes a company's responsibilities to multiple stakeholders, such as employees and the community at large, in addition to its traditional responsibilities to economic shareholders (Clarkson, 1995; Donaldson & Preston, 1995; Freeman, 1984; Shrivastava, 1995). Early CSP work focused on firms' alleged wrongdoings, how firms affect specific social groups, and how firms' actions might be controlled through regulation, public pressure, and judicial actions (Sethi, 1995). Recently, however, attention has been directed toward identifying how socially responsible actions may be associated with certain competitive advantages (Porter & van der Linde, 1995; Romm, 1994; Shrivastava, 1995). For example, researchers have investigated relationships between corporate social performance and corporate financial success (Cochran & Wood, 1984; Johnson & Greening, 1994; McGuire, Sundgren, & Schneeweis, 1988; Waddock & Graves, 1994) and between CSP and certain consumer purchase decisions (Romm, 1994; Solomon & Hanson, 1985; Vandermerwe & Oliff, 1990). Additionally, scholars have suggested that firms adopting socially responsible actions may develop more positive images, which yield a

competitive advantage by attracting a higher quantity and quality of human resources (Davis, 1973; Fombrun & Shanley, 1990); however, no previous research has investigated such links.

Attracting and retaining superior human resources can provide organizations with a sustained competitive advantage (Lado & Wilson, 1994; Pfeffer, 1994; Wright, Ferris, Hiller, & Kroll, 1995). As scholars have noted, with the current labor shortages in some fields (e.g., engineering, programming) and the projected shortages in the future, attracting top-quality applicants is becoming increasingly important for organizational success (Jackson & Schuler, 1990; Offermann & Gowing, 1990; Rynes, 1991). Organizations that attract more qualified applicants have a larger applicant pool, which results in greater utility of the organization's selection system and a potential competitive advantage (Lado & Wilson, 1994; Murphy, 1986). Little research, however, has investigated factors that influence applicants' initial attraction to a firm, which in turn influences their decision to interview with the firm (Barber & Roehling, 1993; Gatewood, Gowan, & Lautenschlager, 1993; Rynes, 1991). Nonetheless, scholars have suggested that initial applicant attraction to a firm is based on perceptions of the firm's image, which is thought to be influenced by the firm's corporate social performance (Fombrun & Shanley, 1990; Rynes, 1991). For example, certain companies, such as IBM, General Motors, and Microsoft, are sending out brochures to prospective applicants promoting their companies' philanthropic and environmental programs, indicating that some firms are using social responsibility as a recruitment tool (Poe & Courter, 1995). Drawing on propositions from social identity theory (Ashforth & Mael, 1989) and signaling theory (Rynes, 1991), we expected that firms engaging in socially responsible actions would have more positive reputations and would be perceived as more attractive employers by potential applicants, thereby providing those companies with a competitive advantage over their rivals.

THEORETICAL BACKGROUND

Wood noted that a firm's social reponsibilities are met by "individual human actors" (1991: 699) who manage in a changing environment that is full of choices. Managers, therefore, can (and do) take different actions regarding their level of environmental scanning (Fahey & Narayanan, 1986), their management of stakeholder relationships (Clarkson, 1995; Freeman, 1984), and their activities regarding emerging and developing social and political issues (Chase, 1984; Greening & Gray, 1994; Wartick & Cochran, 1985). These different actions result in considerable variability in the organization's social programs and policies (Wartick & Cochran, 1985), which, in turn, are expected to affect the organization's reputation and its attractiveness as an employer (Fombrun & Shanley, 1990).

An organization's social policies and programs may attract potential applicants by serving as a signal of working conditions in the organization. Scholars have suggested that because applicants have incomplete information about organizations, they interpret information they receive as signals

about the organizations' working conditions (Breaugh, 1992; Rynes, 1991; Spence, 1974). More specifically, propositions based on signaling theory suggest that organizational attributes provide applicants with information about what it would be like to be a member of an organization because such attributes are interpreted as providing information about working conditions in the organization. For example, a firm's policy to manage diversity may influence its attractiveness as an employer because of what it signals about the firm's working conditions (Williams & Bauer, 1994). Similarly, it seems likely that a firm's corporate social performance provides a signal about working conditions in the organization by denoting certain organizational values and norms. As Chatman (1989) noted, people are attracted to organizations they view as having values and norms they deem important. Because a firm's CSP is thought to signal certain values and norms, it seems likely that it influences applicants' perceptions of working conditions in the organization and, therefore, the attractiveness of the organization as an employer.

Furthermore, social identity theory suggests that people classify themselves into social categories on the basis of various factors, such as the organization they work for, and that membership in these social categories influences an individual's self-concept (Ashforth & Mael, 1989; Dutton, Dukerich, & Harquail, 1994). For example, Dutton and Dukerich (1991) described how actions taken by the Port Authority of New York and New Jersey influenced employees' self-concepts. In particular, they noted that organizational actions on social issues can be particularly influential in enhancing or damaging a firm's image and, by extension, employees' self-images. Because corporate social performance incorporates organizational actions on social issues, we would expect that it influences organizational image and thus, applicants' image of what it would be like to work for the firm. More specifically, we expect that CSP positively affects an organization's attractiveness as an employer because potential applicants will expect to experience positive outcomes, such as an enhanced self-concept, from being employed by a firm that engages in more socially responsible actions.

Although recruitment theories suggest that organizational attributes, such as corporate social performance, may influence applicants' initial attraction to firms, little research has investigated such effects (Barber & Roehling, 1993; Rynes, 1991; Rynes & Barber, 1990). Some empirical evidence suggests, however, that organizational attributes do influence an organization's attractiveness as an employer. For example, Turban and Keon (1993) found that applicants were more attracted to firms that were decentralized in decision making and to firms that based pay on performance rather than on tenure. Gatewood and colleagues (1993) found that potential job applicants' intentions to pursue employment with a firm were related to their perceptions of the firm's image. In addition, some evidence suggests that firms that engage in socially responsible actions are seen as more attractive employers. Bauer and Aiman-Smith (1996) found that firms with a pro-environmental stance were viewed as more attractive employers than

firms without such a stance. Wright and colleagues (1995) found that the financial markets reacted positively to firms with award-winning affirmative action programs and negatively to firms with discriminatory practices, and those authors also suggested that firms with positive affirmative action programs were more able to attract high-quality human resources than firms with discriminatory practices. Because treatment of the environment and treatment of women and minorities are dimensions used to measures corporate social performance, our studies further investigate the link between CSP and organizational attractiveness as an employer.

In summary, scholars have suggested that CSP may provide a competitive advantage to firms by attracting a larger pool of candidates (Davis, 1973; Fombrun & Shanley, 1990), although no research has investigated such relationships. Therefore, we investigated whether firms' actual corporate social performance is related to their reputations and their attractiveness as employers. Drawing on propositions from signaling and social identity theory, we would expect firm CSP to be positively related to corporate reputation and to attractiveness as an employer.

> *Hypothesis 1. Organizations higher on independently rated corporate social performance will have more positive reputations and will be perceived as more attractive employers than organizations lower on corporate social performance.*

METHODS

Procedures

The unit of analysis for this study was the organization, and we investigated the relationships between organizations' corporate social performance, their attractiveness as employers, and their reputations. The sample of organizations was drawn from Kinder, Lydenberg, Domini & Co. (KLD) Company Profiles, a database that has been used by several researchers interested in CSP (Graves & Waddock, 1994; Johnson & Greening, 1994; Ruf, Muralidhar, & Paul, 1993) and is the largest multidimensional CSP database available to the public. We used data from the 1992–93 database, which contains ratings for 633 organizations. We used several heuristics in determining which companies to use for our study, which involved students rating the reputations and attractiveness of the organizations. Because we originally planned to investigate the relationships of the KLD ratings with *Fortune*'s annually published reputation ratings, we included only companies that were in both the KLD database and the *Fortune* ratings. We then eliminated companies that were unknown to four management department faculty members and five business school seniors who were representative of our intended respondents. These deletions left 189 companies. Finally, when more than two-thirds of the students rating the firms indicated they could not judge the reputation or the attractiveness of an organization, we

did not include that organization in the analyses. Applying these heuristics resulted in 161 firms with reputation ratings and 160 firms with attractiveness ratings.

Measures

Corporate social performance ratings. As numerous authors have noted, CSP has been difficult to study because of measurement issues (Carroll, 1991; Graves & Waddock, 1994; Wokutch & McKinney, 1991). Researchers have measured corporate social performance utilizing surveys, content analyses of annual reports, expert evaluations, activities in controlling pollution, and fines imposed by the Environmental Protection Agency (Aupperle, 1991; Bowman, 1978; Wolfe, 1991; Zahra, Oviatt, & Minyard, 1993). Recently, however, scholars interested in corporate social performance have used Company Profiles, a database developed by Kinder, Lydenberg, Domini and Company. This financial advisory firm specializes in the assessment of companies' corporate social performance; one of the products they produce is Company Profiles. As Graves and Waddock (1994: 1039) noted, there are several advantages of using the KLD ratings as a measure of CSP: KLD rates firms using an objective set of screening criteria, the ratings are applied consistently across all companies, and KLD consists of knowledgeable individuals who are not affiliated with any of the rated companies.

KLD rates firms on nine dimensions of corporate social performance, five of which are typically used for research. These dimensions are community relations, treatment of women and minorities, employee relations, treatment of the environment, and quality of services and products. Every firm in the KLD database is given a "strength" and a "concern" score for each dimension. Specifically, the firms can be given an X for a moderate concern or strength, an XX for a strong concern of strength, or a blank to indicate no special concerns or strengths. We followed procedures used by several researchers (Johnson & Greening, 1994; Sharfman, 1993) and coded a blank as 0, a moderate strength as 1, a strong strength as 2, a moderate concern as −1, and a strong concern as −2. For each CSP dimension, a firm's score was the sum of its concern and strength ratings; therefore, scores could range from −2 to +2.

Organization reputation. Students ($n = 75$) in two sections of a senior-level strategic management course rated 189 companies in terms of their reputations on a five-point scale ranging from 1, "very poor reputation," to 5, "very good reputation." Respondents were also given a "cannot judge" option. As noted above, an organization was retained for subsequent analyses only if at least one-third of the respondents actually rated it. Each organization's reputation score was the average rating for the respondents who rated the firm. Average reputation ratings ranged from 2.74 to 4.87.

Organizational attractiveness as an employer. We followed a similar procedure, using different students, to obtain ratings of organizational attractiveness as an employer. Students in two sections of a senior-level strategic management course ($n = 34$) rated each of the 189 companies in terms

of its attractiveness as an employer on a five-point scale ranging from 1, "unattractive employer," to 5, "one of the most attractive employers." Again, respondents were given a "cannot judge" option, and we retained an organization for subsequent analyses only if at least one-third of the respondents actually rated it. Each organization's score for attractiveness as an employer was the average rating for the respondents who rated the firm; such ratings ranged from 2.68 to 4.64.

Control variables. Because we expected larger and more profitable firms to receive more publicity and to have greater name recognition, we controlled for organization size and firm profitablity. Turban and Keon (1993) presented evidence that an organization's size influences its attractiveness, although such effects were moderated by applicants' self-esteem and need for achievement. In addition, evidence indicates that a firm's profitability is related to its reputation (Brown & Perry, 1994). We measured firm size as total assets and measured firm profitability as return on assets, using data obtained from the Standard & Poor's COMPUSTAT Annual Data tapes.

ANALYSES AND RESULTS

Table 1 presents descriptive statistics and correlations among the variables. In general, although the CSP dimensions were significantly correlated with each other, none of these correlations was higher than .48, suggesting that corporate social performance is a multidimensional construct and providing support for our separate analysis of the five dimensions. Assets (firm size) was not significantly related to either reputation or employer attractiveness, although it was positively related to community relations and the treatment of women and minorities and negatively related to product quality. Profitability was positively correlated with community relations, reputation, and employer attractiveness, supporting its inclusion as a control variable.

Examination of the correlations indicates that organizations' corporate social performance is related positively to their reputations and attractiveness as an employer. Specifically, reputation is correlated significantly with community relations, employee relations, environment, and product quality. Attractiveness as an employer is correlated significantly with community relations, employee relations, and product quality. To further investigate whether CSP is related to organizational reputation and attractiveness as an employer, we conducted hierarchical regression analyses, controlling for assets and profitability. Specifically, we entered the two control variables in the first step and the five CSP dimensions in the second step. The change in R^2 from step 1 to step 2 provides a test of whether the set of CSP dimensions explains variance in the dependent variable beyond what the control variables explain. The significance of the regression coefficients indicates whether the CSP dimensions explain unique variance in the dependent variable. As shown in Table 2, after we controlled for assets and profitability, the set of CSP dimensions explained an additional 9 percent of the variance in

TABLE 1
Correlations and Descriptive Statistics[a]

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9
Corporate social performance											
1. Community relations	0.67	0.82									
2. Employee relations	0.07	1.02	.40**								
3. Environment	-0.38	0.85	.26**	.21**							
4. Product quality	-0.35	0.95	.00	.18*	.30**						
5. Treatment of women and minorities	0.55	0.94	.48**	.31**	.18*	-.01					
Control variables											
6. Assets	25,415.00	42,910.00	.22**	.02	-.01	-.19*	.31**				
7. Profitability	0.04	0.05	.16*	.14†	-.02	-.07	.11	.00			
Reputation and attractiveness											
8. Corporate reputation	3.85	0.36	.16*	.20**	.21**	.16*	.15†	-.05	.25**		
9. Attractiveness as an employer	3.59	0.41	.22**	.25**	.06	.16*	.13†	.13	.23**	.75**	

[a] Values of *n* ranged from 155 to 171.

† *p* ≤ .10
* *p* ≤ .05
** *p* ≤ .01

TABLE 2
Results of Regression Analyses Predicting Reputation and Employer Attractiveness[a]

Predictors	Attractiveness as an Employer		Organizational Reputation	
	β	Change in R^2	β	Change in R^2
Step 1		.07**		.07**
Assets	.14†		−.06	
Profitability	.19*		.22**	
Step 2		.09**		.07*
Community relations	.12		.03	
Employee relations	.16†		.09	
Environment	−.05		.13	
Product quality	.19*		.10	
Treatment of women and minorities	−.03		.08	
Total R^2		.15**		.14**

[a] Standardized regression coefficients for the full model are shown. The unit of analysis is the organization; $n = 160$ for attractiveness as an employer and 161 for reputation.

† $p \leq .10$
* $p \leq .05$
** $p \leq .01$

attractiveness as an employer and an additional 7 percent of the variance in reputation. Product quality and employee relations (at the .10 alpha level) explained unique variance in attractiveness as an employer. None of the CSP dimensions, however, explained unique variance in organizational reputation, although, as noted above, the set of CSP dimensions added a significant amount of unique variance in reputation. Taken in sum, such results support the conclusion that an organization's corporate social performance is related to its attractiveness as an employer and its reputation.

Unfamiliarity with firms. We conducted additional analyses to investigate factors related to the percentage of respondents who indicated they couldn't judge a firm's reputation or attractiveness as an employer.[1] Although different respondents rated firms for reputation and employer attractiveness, across firms the correlation between the percentage of respondents who couldn't judge reputation and the percentage of respondents who couldn't judge attractiveness as an employer was .96. Therefore, we created a measure, *unfamiliarity with firm,* that was the average of those two percentages. Unfamiliarity with firm ranged from 0.5 to 82.5, indicating some firms (the ones with low scores) were very familiar to repondents and that other firms (those with high scores) were very unfamiliar to respondents.

We calculated correlations between the variable for unfamiliarity with firm and firm size, profitability, media exposure (obtained from All News, a Lexis-Nexis database), advertising expenditures (from Standard & Poor's

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[1] We thank an anonymous reviewer for suggesting these analyses.

COMPUSTAT tapes), reputation, employer attractiveness (using only the 161 and 160 firms with, respectively, reputation and attractiveness ratings), and the five KLD dimensions. Unfamiliarity with firm was negatively correlated with firm size (-.25), media exposure (-.45), advertising expenditures (-.40), reputation (-.52), attractiveness as an employer (-.49), community relations (-.27), and treatment of women and minorities (-.31). We also investigated curvilinear relationships between the KLD dimensions and unfamiliarity, positing that firms with very poor or very good corporate social performance would be known but that firms with average CSP would be relatively unknown (i.e., that an inverted U-shaped relationship between *unfamiliarity* and the CSP dimension would be observed). Results indicated curvilinear relationships for product quality and employee relations (at the .07 alpha level); however, the form of this relationship indicated that as CSP increased, unfamiliarity decreased at an accelerating rate. In general, the results indicate that firms that are more familiar to potential job applicants are larger, are in the newspapers more frequently, advertise more, and tend to have better community relations, treatment of women and minorities, product quality, and employee relations. Interestingly, profitability was not related to unfamiliarity. The negative correlations of reputation and attractiveness as an employer with unfamiliarity suggest that, in general, the more people who have heard about a firm, the more positively the firm is regarded. Additional analyses indicated that industry did not predict unfamiliarity, although, as might be expected, firms that recruited on campus were more familiar than firms that didn't recruit on campus ($\bar{x}$ = 20% and 37% for unfamiliarity, respectively) and firms that provided materials to the career services were also more familiar than firms that didn't provide materials to the career service office ($\bar{x}$ = 18% and 39%, respectively).

DISCUSSION

We investigated the relationships between firms' corporate social performance (CSP), based on ratings obtained from the KLD database, and firms' reputations and attractiveness as employers. Results indicate that firms higher in CSP have more positive reputations and are more attractive employers than firms lower in CSP. Such results suggest that potential applicants are aware of firms' corporate social performance and that those with more positive ratings may have competitive advantages because they attract more potential applicants than firms with lower CSP ratings. More broadly, our results extend other work indicating that firms' positive corporate social performance may lead to potential competitive advantages and suggest that firms' leaders may wish to consider not only the moral or ethical rationale for proactive corporate social actions (Swanson, 1995), but also the potential competitive advantages it may afford them. For example, Porter and van der Linde (1995) indicated that many firms develop competitive advantage by "being green" and taking proactive steps to develop innovative solutions to hazardous waste and pollution problems. Our results also support an asso-

ciation between corporate social performance activities and potential competitive advantages.

Drawing on propositions from social identity theory that an employee's self-concept is influenced by membership in an organization (Ashforth & Mael, 1989; Dutton & Dukerich, 1991), we proposed that firms with positive, rather than negative, CSP would have better reputations and would be seen as more attractive employers because potential applicants would expect to have more positive self-concepts when they worked for them. With the plethora of publicity about organizations' behavior in regard to environmental activities, affirmative action, product quality, and employee relations, we expected potential applicants to be somewhat aware of firms' corporate social performance and to use such information in determining their attraction to the firms.

Judge and Bretz (1992) theorized that applicants' perceptions of an organization's values may be influenced by the organization's concern for the environment. Similarly, we theorized that a firm's CSP provides potential applicants with signals about the organization's value system, which influences applicants' perceptions of working conditions and subsequent attraction to the organization. It seems likely, however, that some of the CSP dimensions, such as treatment of women and minorities and employee relations, were more likely to be interpreted as providing signals about working conditions in the organization than were other CSP dimensions, such as concern for the environment and product quality. Future research might use structural equation modeling to investigate whether organizational values and perceptions of working conditions mediate the relationship between CSP and organizational attractiveness as an employer. For example, researchers might use the Organizational Culture Profile (OCP; O'Reilly, Chatman, & Caldwell, 1991) to investigate whether the CSP dimension "treatment of women and minorities" influences the OCP dimension "respect for people," which in turn influences perceptions of working conditions and organizational attractiveness.

More broadly, research is needed to further explicate the causal relationships among corporate social performance, reputation, and attractiveness as an employer. We conceptualized CSP as the set of socially responsible or irresponsible activities by firms and proposed that CSP influences perceptions of their reputations and attractiveness as employers. Our results support this conceptualization, but because the data are cross-sectional, additional research is needed to investigate the causal mechanisms linking these variables. Additionally, research might further extend social identity theory by investigating whether individuals who work for firms with positive CSP report higher levels of organizational identification (Mael & Tetrick, 1992) than individuals working for firms with negative CSP. Distinctiveness has been shown to be a significant factor in increasing the tendency of individuals to identify with a social group (Ashforth & Mael, 1989); therefore, one might expect that individuals working for firms with distinctive and positive reputations for corporate social performance (e.g., The Body

Shop, Ben & Jerry's) will have stronger identification with those companies than employees working for firms with negative CSP reputations (e.g., the Port Authority of New York during crises involving homeless people [Dutton & Dukerich, 1991]), although research investigating such relationships is needed.

We investigated factors related to potential applicants' unfamiliarity with firms. Results indicated that the firms that were more familiar to potential applicants were larger; had more media exposure, larger advertising budgets, more positive CSP, and more positive ratings for reputation and attractiveness as employers; and were more likely to recruit on campus and to provide materials to the college placement center. Industry and profitability were not related to respondents' familiarity with firms, although these results must be interpreted with caution because industries were not equally represented across firms (e.g., over two-thirds were in manufacturing). Of particular interest is the finding that the firms that were more familiar to respondents tended to have more positive reputations and were rated as more attractive employers. Such results extend Gatewood and colleagues' (1993) finding that applicant ratings of familiarity with a firm were related to ratings of the firm's overall corporate image and support their conclusion that the more applicants know about firms, the more positively the firms are evaluated. The mechanism for this relationship is unknown, however. One explanation for this finding is that because firms attempt to have positive information disseminated about themselves, in general, applicants are familiar with a firm because they have heard something positive about it. Another explanation is based on evidence that increased exposure to an object increases positive evaluations of that object (Zajonc, 1968); this suggests that applicants tend to rate more positively what they've been exposed to frequently, regardless of the nature of that information.

Our analyses were conducted on firms that were at least somewhat familiar to the respondents (i.e., at least one-third of the subjects were familiar enough with the firm to rate it), suggesting that corporate social performance may provide a competitive advantage in attracting applicants only when applicants are familiar with a firm and its CSP. Therefore, firms may want to publicize their positive corporate social performance activities. Furthermore, given evidence that brochure content influences applicant attraction to firms (Mason & Belt, 1986; Schwoerer & Rosen, 1989), firms may want to highlight their corporate social performance in their recruitment brochures. We would prescribe that firms accurately describe their CSP activities and be careful not to inflate those descriptions in an attempt to attract applicants. A misrepresentation of CSP activities may lead to unmet expectations on the part of new employees, which may then lead to job dissatisfaction and turnover (Wanous, Poland, Premack, & Davis, 1992). Therefore, unrealistically positive descriptions of firms' CSP may attract more applicants but may lead to dissatisfied employees who subsequently leave a firm, although future research is necessary to investigate this proposition. Nonetheless, our results suggest that firms should publicize their corporate social

performance in an attempt to attract applicants, although they should provide realistic descriptions of their CSP activities.

Our results indicate that independent ratings of a firm's corporate social performance were related to ratings of the firm's reputation and attractiveness as an employer, suggesting that such performance may provide a competitive advantage by attracting potential applicants. Additional research is needed at the individual level of analysis to investigate the importance of CSP for actual applicants involved in a job search. For example, researchers might investigate whether CSP influences various applicant decisions, such as the decision to interview with a firm or the decision to accept a job offer. Evidence from studies adopting the person-organization fit perspective (e.g., Judge & Bretz, 1992; Turban & Keon, 1993) suggests that a firm's CSP may be more important in influencing applicant decisions about pursuing employment with the firm for individuals with certain characteristics and values. For example, because women and members of minorities have different perceptions of affirmative action than do men and nonminorities (Kravitz & Platania, 1993), it seems likely that women and minorities may react differently to the treatment of women and minorities than do men and nonminorities. In general, we expect that corporate social performance will be less important for applicants with few choices because, at the extreme, applicants with only one job opportunity may not be influenced by the firm's CSP. Our results may hold only for the top-quality applicants who are pursued by many firms and typically have many choices. These are the applicants whom firms are attempting to attract, however, so CSP may provide a competitive advantage by attracting such applicants.

In sum, results suggest the importance of firm's corporate social performance for influencing ratings of reputation and attractiveness as an employer. Furthermore, our results highlight the importance of corporate image as an influence on prospective applicants' attraction to a firm. At a time when corporate success depends more and more on a high-quality workforce, firms are becoming increasingly aware of the need to attract the best workers to their companies. Many normative works have stressed the need for firms' positive corporate social performance; our research specifically suggests that firms may develop competitive advantages by being perceived as attractive places of employment because of their performance in regard to quality products and services, treatment of the environment, and issues of diversity. Firms can do this by signaling potential workers in brochures and advertisements that they offer a work environment conducive to socially responsible activities and by providing a culture and environment that reinforce individual workers' self-concepts and social identities. Our results suggest that corporate social performance may, in fact, be "good business" (Solomon & Hanson, 1985).

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INTERORGANIZATIONAL LINKS
AND INNOVATION:
THE CASE OF HOSPITAL SERVICES

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Interorganizational links—cooperative relationships among distinct but related organizations—are believed to enhance innovative processes in organizations. We conceptualize various types of interorganizational links as opportunities for learning and resource sharing in the pursuit of innovation. A study of over 400 California hospitals over ten years found considerable support for the relationship between interorganizational links and innovation. Structural, institutional, and resource-based links were all strongly related to innovation in hospital services and technologies.

In recent years, fundamental changes in regulation, global competition, and technology have made it more difficult for firms to successfully compete alone. Across different industries, firms are increasingly blending their competitive strategies with cooperative strategies, using a variety of network links to coordinate interorganizational activities, manage environmental turbulence, and rationalize interdependence (Nielsen, 1988). These collaborative interactions have become an alternative strategy for developing and enhancing competitive advantages. Following Oliver, we define interorganizational links as "enduring transactions, flows, and linkages that occur among or between an organization and one or more organizations in its environment" (Oliver, 1990: 241). Within this emerging perspective, interorganizational links provide an alternative way of modeling and understanding organizational conduct.

For years, scholars in innovation research have tried to answer a most fundamental question: *What determines innovation in an organizational setting?* Despite extensive studies on the determinants of innovation, results have often been confusing and inconclusive (Kimberly & Evanisko, 1981).

Neoclassical economics and traditional approaches to strategic management have long stressed the values of pluralism and rivalry as the best approach to promoting organizational innovation. Schumpeter (1934) claimed that only larger, internalized firms can afford innovation because of high R&D costs and the need to control early product markets to recoup them (Teece, 1992). However, innovation has grown more difficult for independent firms in recent years because of dispersion of technical competence and increasing complexity and uncertainty in technical business environments (Powell, 1990). Institutional pressures for conformity and organizational barriers to change further shackle the ability of a single firm to consistently innovate.

Increasingly, interorganizational links are thought to enhance the innovative capabilities of organizations by providing opportunities for shared learning, transfer of technical knowledge, legitimacy, and resource exchange (Nohria & Eccles, 1992). Firms use interorganizational coordination to acquire new technologies and expand their product-market reach (Pennings & Harianto, 1992). Indeed, innovative technologies or administrative structures are often at the nexus of organizational links. However, empirical support for the effects of interorganizational links on firm-level innovation has been inconsistent and largely anecdotal, and large-scale, longitudinal studies have been rare (Sofaer & Myrtle, 1991; Thomas & Trevino, 1993).

In this study, we examined the growth of interorganizational links in a population of competing organizations (hospitals) and the influence of these strategies on organization-level innovation. Following the logic in Damanpour (1991), we defined an innovation in health care as a medical technology, structure, administrative system, or service that is relatively new to the overall industry and newly adopted by hospitals in a particular market area. In particular, we concentrated on *service innovations:* innovations that incorporate changes in the technology, design, or delivery of a particular service or bundle of services. We conceptualized several ways in which interorganizational links influence innovation in hospitals and examined the effects of four types of interorganizational links on hospital innovation through a longitudinal study of 388 California acute care hospitals over a period of ten years. Our results support much of the current thinking on interorganizational coordination and innovation and suggest avenues for theoretical refinement and future empirical investigation.

CONCEPTUAL FRAMEWORK AND HYPOTHESES

The literature on interorganizational links has grown dramatically in the last decade, and a variety of theoretical approaches has been offered to explain their emergence, growth, and functioning (D'Aunno & Zuckerman, 1987a; Galaskiewicz, 1985). Oliver (1990) argued that the decision to initiate relations with another organization is commonly based on multiple contingencies such as necessity, asymmetry, reciprocity, efficiency, stability, and legitimacy. Indeed, Galaskiewicz (1985) asserted that there is no one theory of interorganizational links.

Levine and White (1961) focused early attention on exchange (and reciprocity) as the driving force behind interorganizational structuring. Consistent with the open-systems perspective, the resource dependence model has been the dominant rationale for interorganizational links (Aldrich, 1979; Pfeffer & Salancik, 1978). This model suggests that organizations are dependent on their task environment for inputs that are essential for their functioning. Since organizations cannot internally generate all needed resources, they exchange with other organizations to obtain them. But resources are often scarce, and organizations tend to compete for them. The resource dependence model focuses on interorganizational efforts to gain power and control over essential resources while minimizing threats to organizational autonomy (Cummings, 1984).

Williamson (1991) argued that firms will internalize market activities within a hierarchy when faced with transactional inefficiency in the open market. However, fully internalized hierarchies suffer "organizing costs" that also lead to inefficiency (Masten, Meehan, & Snyder, 1990). As an intermediate form of governance, interorganizational links use transactional reciprocity to mitigate the defects leading to market failures. Interorganizational links overcome risks arising from opportunism, discourage the pursuit of subgoals through superior monitoring mechanisms, and create mutual incentives to reveal information and share technology (Kogut, 1988). Interorganizational links can also circumvent many of the administrative costs of hierarchical forms, while maintaining market efficiencies that flow from scale and scope economies and operational flexibility (Jarillo, 1988).

Others have argued that interorganizational links generate benefits through synergy and expanded market power. In a collaborative relationship, member organizations can be seen as chains of distinctive competencies. By specializing in its areas of core competence, while expanding the production function to encompass the competencies of partner firms, each firm can achieve economies of scope through a reconfigured value chain. Miles and Snow (1986) noted that by focusing on its own distinctive competence, each organization can play a synergistic role that benefits its entire industry. Thorelli (1986) argued that interorganizational links can yield greater market power and "differential advantage" by meshing the economic base, technical expertise, and legitimacy of constituent organizations. Early adopters of network strategies find opportunities to exert political influence, create standards for legitimacy, and control information (Miles & Snow, 1984).

Although most studies have focused on economic, political, and institutional rationales to explain why interorganizational links emerge, some prior research has also attempted to delineate the situations that lead to higher group performance in interorganizational links (Schopler, 1987; Thomas & Trevino, 1993; Van de Ven & Walker, 1984]. In their in-depth investigation of three hospital alliances, Thomas and Trevino (1993) explored the information-processing mechanisms that directly promote the success of hospital alliances by reducing uncertainty and equivocality in

joint decision making. However, these studies were not specific about how decision makers' attempts to facilitate information processing at the alliance level affected each partner's performance through the alliances. Studies have also examined the diffusion of innovation through interorganizational links in educational innovations, medical techniques, and human-service-delivery systems (cf. Aldrich & Whetten, 1981). However, most research has focused on the diffusion of innovations at the industry or network level. There has been less attention paid to the effect of interorganizational links on such firm-level strategic decisions or outcomes as service adoption and organizational innovation. Moreover, among the few studies that have examined the effect of interorganizational links on innovation, findings have conflicted. Pennings and Harianto (1992) found strong evidence that interorganizational links facilitated banking-related service innovations. However, Kotabe and Swan (1995) found no evidence that "cooperating firms" tended to introduce more innovative products. Importantly, these studies have simply considered whether or not multiple firms were involved in a product introduction and ignored the complexity of the multiple forms of interorganizational links that could influence an innovation. Aldrich and Whetten (1981) noted that despite the presence of multiple forms of interorganizational links, most interorganizational studies have studied only one type of link. Overall, there is little evidence based on large-scale longitudinal data that interorganizational links affect organization-level strategic outcomes.

Interorganizational Links and Innovation

As collaborative links have proliferated, organizations have configured these relationships into various organizational, legal, and governance structures. Prior studies have used multiple terms to categorize these network relationships, such as strategic alliances, joint ventures, consortia, industry associations, licensing, sourcing agreements, coordinated contracting, and so forth. Given this variation and confusion in the forms of interorganizational links, it is imperative to specify the relationship between interorganizational links and innovation according to the practice followed within the industry of interest. Pennings and Harianto (1992) noted that the operational nature of interorganizational links is specific to the industry and the technology or service involved. Furthermore, different types of interorganizational links often occur under different conditions (Oliver, 1990).

Our general proposition was that organization-level *innovative capability and adoption of innovations is enhanced by the development of interorganizational links.* We evaluated this proposition in the context of one industry, the acute care hospital industry in the State of California. We theorized and developed hypotheses about the relationships between innovation and four different but nonexclusive types of interorganizational links that have particular relevance for innovation in acute-care hospitals.

Structural links. Environmental uncertainty and interdependency among firms hinder innovation through market mechanisms or hierarchical governance. Innovation carries substantial risk since firm decisions are con-

strained by incomplete information and bounded rationality. Such conditions create an "innovation risk" (Child, 1987), which is presented by a context of accelerating technological change. Firms are not sure of which innovations to adopt or which strategic changes to follow. Individual firms often lack the capability to search for and process sources of concepts and ideas (Teece, 1980), or they lack sufficient flexibility for speedy adaptation to changing environments and new ideas.

Organizations also cannot depend on market mechanisms for the information necessary for innovation. In the market for information on new technologies or administrative models, transaction difficulties make it hard for firms to recognize and obtain necessary information from transaction partners. Under bounded rationality, buyers' uncertainty and asymmetrical ownership of information create a "knowledge paradox" (Alston & Gillespie, 1989). Information buyers have trouble fully understanding what they are buying, and sellers are reluctant to reveal the true value of the information for sale, fearing that buyers could get it free of charge (Teece, 1980). Interorganizational links help organizations overcome transaction problems by internalizing information exchange into some form of governance structure (Williamson, 1991). In such cases, network ties cross organizational boundaries and act as a conduit for ideas and innovations (Galaskiewicz & Wasserman, 1989). Transactions in a network are more efficient because each member can focus on its own competences instead of trying to be a generalist. Reciprocity provides mutual safeguards against the transaction hazards that might occur in a market setting because retaliation against recalcitrant partners is easy (Kogut, 1988).

A fast-growing form of structural link in the hospital industry over the last decade has been the multihospital system (MHS). An MHS is defined as two or more affiliated hospitals that are partially or fully owned, sponsored, or managed within a corporate framework (Morrisey & Alexander, 1987). Although such systems vary in complexity, strategic control, ownership, and market focus, they usually involve a governance structure that is legally distinct from the management structures of their member hospitals. Individual hospitals join systems for many reasons that relate to innovation. These include gaining wider access to capital financing or product and market information, sharing management expertise, and pursuing opportunities for geographic expansion (Fottler, Schermerhorn, Wong, & Money, 1982). Provan (1984) also found that systems formed as a strategic response to critical resource dependencies and that major operating or strategic decisions of individual hospitals were influenced by system affiliation.

To the extent that MHS membership improves access to resources, creates opportunities for shared learning, and provides a more trusting environment for joint transactions, it acts as a collaborative mechanism to overcome the uncertainty and diffusion of technical knowledge. Systems help to buffer hospitals from external uncertainties such as unexpected competition from other hospitals and changes in medical technology and regulations (Provan, 1984). Through system links, hospitals reduce the costs of innova-

tion by sharing information on efficient management techniques, services, and even purchasing.

> *Hypothesis 1. Hospitals are more likely to adopt service innovations when they are structurally linked with other hospitals.*

Administrative links. According to the resource-based view, firms are heterogeneous with respect to their resources and capabilities (Barney, 1991). Unlike some other resources, innovation capabilities are often difficult to imitate because they reside in organizational routines and are invisible to outsiders. Since innovation capabilities and technological expertise are widely dispersed, it is impossible for even a very large firm to master all the resources and capabilities necessary for innovation. Further, resource endowments are "sticky" (Barney, 1991) over strategically relevant time frames—absent administrative links, firms are stuck with what they have because of the imperfect mobility and the complexity of resources and capabilities (Barney, 1991). Forming a structural link is not sufficient to enhance innovation unless hospitals have the managerial capacity to effectively exploit the link (Cohen & Levinthal, 1990).

Patterns of innovation in an industry differ significantly because of sticky and heterogeneous organizational resources and capabilities (Nelson, 1991). When a firm develops a successful innovation, competitors differ in their ability to imitate it or develop something comparable. Even recognition of new innovation opportunities is affected by the mechanisms that link an organization with an innovation. Administrative links bypass the stickiness of capabilities, providing easier and faster mechanisms for accumulating organization-specific assets. They allow networked organizations to access superior managerial capabilities held by other members to complement their own resources (Hamel, 1991).

Administrative links also enhance the learning process for the innovation capability and the necessary procedures and activities. They generate opportunities for acquired learning and knowledge to cross industry and organizational boundaries, allowing multiple firms to offset the cost and time required to develop new products or routines (Galaskiewicz & Wasserman, 1989). Administrative links also help to accelerate learning by preventing mistakes and identifying emerging standards early in a development process.

One way in which hospitals link administratively is through management contracts, a strategy often used to access managerial and financial resources and organization-specific competencies owned by other hospitals (Fottler et al., 1982). Although structural links (multihospital systems) and administrative links (management contracts) serve some similar purposes, a management contract is a looser, more temporary form of governing cooperative behavior than a multihospital system (Alexander & Morrisey, 1989). Management contracts among hospitals rarely result in centralized management, ownership, or control and give the affiliated hospitals more autonomy

and flexibility than multihospital systems (Provan, 1984). In the latter, policy direction and operational goals are often established by system headquarters, but under management contracts managed hospitals influence administrative policy through the specification of contract provisions and board approval of major operational changes (Alexander & Morrisey, 1989).

Nonetheless, management contracts carry innovation benefits for both parties. For the hospital providing the managerial talent, contractual relationships widen its influence, provide entrée to new geographic or product markets, and create a training ground for up-and-coming executives. For the contracting hospital, such arrangements can plug temporary gaps in leadership and bring outside experience, knowledge, and access to technological and financial resources from the contractor, thereby increasing managerial capacity for innovation (Alexander & Morrisey, 1989; Cohen & Levinthal, 1990).

> *Hypothesis 2. Hospitals are more likely to adopt service innovations when they are administratively linked with other hospitals.*

Institutional links. Open-system approaches such as resource dependence, institutional theory, and the social-problem-solving approach also support the notion that interorganizational links facilitate innovations (Cummings, 1984). Both resource dependence and institutional theorists have argued that scarcity makes firms more dependent on their task environments and on other organizations to acquire the resources and legitimacy necessary for the realization of their goals and objectives. The social-problem-solving approach suggests that when the larger social field within which relevant organizations are embedded becomes more complex and turbulent, organizations encounter problems and areas of uncertainty with which they cannot cope alone (Cummings, 1984). In general, the open-systems model predicts that exchanges occur when two or more organizations perceive mutual benefits from interacting to gain resources or legitimacy, or from negotiating a more stable competitive order that will reduce turbulence.

Although in the resource dependence approach, legitimacy is viewed as a resource for organizations to obtain and exchange for material resources that fuel innovation, the institutional perspective illustrates that organizations gain legitimacy for new service innovations through isomorphism with their environments—that is, conforming to commonly accepted structures and procedures. Under the institutional perspective, organizations experience pressure to conform to common understandings of effective and efficient structure and behavior. "Violating such expectations may call an organization's legitimacy into question and thus affect its ability to obtain resources and social support" (D'Aunno & Zuckerman, 1987b: 333).

Hospitals are linked to their institutional environments through a variety of organizational mechanisms, including industry and trade associations, regional and national lobbying groups, and other industry-wide institutional associations (Zuckerman & D'Aunno, 1990). These alliances are

formed around various elements of common interest, including religious preference (e.g., the Consortium for Jewish Hospitals), similar service missions (e.g., the Voluntary Hospitals of America), and geography (e.g., the Northern California Hospital Council). Often these alliances involve the top executives of member hospitals, and personal ties between hospital executives become an opportunity for them to learn more about innovations in treatment or organizational design (Coleman, Katz, & Menzel, 1966).

Hospitals often rely on associations to widen their environmental focus, to share new ideas and technical knowledge, and to gain institutional legitimacy, a particularly important commodity in this industry (Mohr, 1992). Institutional links may play a critical role in member hospitals' innovation adoption by creating channels for information flow and by providing the capacity to acquire and interpret information (Thomas & Trevino, 1993). Organizations often create or join institutional links as a way to mimic other, successful, organizations' strategies in uncertain and equivocal environments (DiMaggio & Powell, 1983) and to enhance legitimacy or to maintain status and prestige (Fennell, 1980).

Hospitals use institutional links to monitor the actions of industry leaders and other competitors and to conform to community norms and prevailing fashions (McKinney, Kaluzny, & Zuckerman, 1991). Pennings (1981) characterized this function of institutional links as "forecasting strategy": a coping behavior whereby decision makers lower uncertainty by predicting or forecasting the behavior of interdependent organizations. One of the most important institutional forces in health care is the acquisition of new technologies or the offering of new services. Institutional associations thus become the mechanism whereby hospitals avoid uncertainty and enhance social legitimacy in pursuing innovations.

> *Hypothesis 3. Hospitals are more likely to adopt service innovations when they are linked with institutional associations.*

Resource links. The starting point of most studies of interorganizational links has been a relation or transaction between two or more organizations (Aldrich & Whetten, 1981). Structural, administrative, and institutional links are formal representations of relations or transactions among related hospitals. Studies have indicated that formal relationships are sometimes merely a symbolic representation of an underlying informal exchange relationship and that resource exchanges occur independent of the active, conscious participation of the organizations involved (Mitchell, 1973; Wiewel & Hunter, 1985). Mitchell (1973) suggested that interorganizational link studies should examine the content of a relation in addition to such formal links. Among various content elements, resource exchange is most apparent in hospital networks and is more directly related to our prediction of hospital innovations. Aldrich and Whetten (1981) noted that focusing on resource exchanges avoids the problems of mixing transitory or ephemeral relations with enduring, consequential ties.

Under the resource dependence perspective, transactions between linked hospitals indicate the level of resource dependency between them and the degree of influence on organizational decisions related hospitals share. Pfeffer and Nowak (1976) showed that mergers and similar interorganizational transactions involve many resource exchanges. Higher levels of resource exchange lead to more frequent interactions between organizations and to greater diffusion of innovative practices among the members, both deliberate and unintended. Aldrich and Whetten (1981) argued that when organizations are closely joined through resource exchanges, members are quick to imitate their partners' innovative behavior. Wiewel and Hunter noted that "within the same environment, organizations of the same type may provide resources to each other through the planned or unplanned exchange of personnel, through the provision of training, money, facilities, or the exchange of information" (1985: 483).

In addition to formal ways of building network links, hospitals often build various types of implicit resource-based networking relationships, both vertically and horizontally. These hospitals are often bound together in terms of equity stakes and personnel, but resource exchanges may occur regardless of any formal structures governing risk and reward sharing. Ordinarily, the market system loses efficiency when transactions involve highly embedded organizational and technical resources and capabilities. A high volume of resource exchanges increases interactions among a larger body of key personnel members from the linked hospitals; these interactions facilitate transferring complementary and interdependent competencies (Nohria & Eccles, 1992).

Tight interdependencies within networks create transactions and materials flows among organizations (Child, 1987; Teece, 1992). As interdependence grows, the exchange of financial resources, organizational routines or systems, technical knowledge, and personnel grows. Technical learning and competence can be encapsulated in these exchanges, enabling innovative capability to cross more actively between related firms or network partners. We capture the variation in network exchange activity by examining the transactional intensity of resource exchanges between hospitals that are related by ownership, key personnel, or other types of informal arrangements.

> *Hypothesis 4. Hospitals are more likely to adopt service innovations when they exhibit high levels of resource exchanges with other related or networked hospitals.*

METHODS

Increasing technical complexity and growing environmental turbulence drove organizations in health care to establish strong interorganizational ties earlier than such ties were established in many other industries. The hospital industry in California has undergone considerable environmental and organizational change over the last two decades, and interorganizational links proliferated over this period (Meyer, Goes, & Brooks, 1993). Given the

regional character of regulation, technology diffusion, and health care markets, the population of acute care hospitals in California affords a reasonable representation of an industry and provides a good venue for studying the effects of interorganizational links and networks on innovation in hospital services.

The sample for this study included all general acute care hospitals in the state for which complete data were available ($N = 388$) over a ten-year period (1981–90). Hospitals owned by the Kaiser Foundation were deliberately excluded because organization-level data were unavailable. Our study drew upon data assembled over two years through a variety of methods: interviews with hospital, network, and alliance executives; field observations; mailed surveys; inspection of organizational documents; and analyses of newspaper accounts, census reports, and secondary hospital performance data. The primary data source was annual hospital disclosure reports from the California Health Facilities Commission (CHFC) and the Office of Statewide Health Planning and Development, supplemented with data from the American Hospital Association (AHA).

Measuring Innovation

Following a diffusion-based approach to measuring innovation, we tracked year-to-year changes across all sample hospitals on an inventory of 135 separate service offerings reported to the state. Although not strictly exhaustive, this inventory captured the vast majority of hospital services that were available. Each service was first coded as either available (1) or not available (0) within each hospital in a given year. Ratings for each of the 135 services were then averaged annually across the industry. Tracking year-to-year changes between these mean scores, we identified the 40 services that showed the greatest rate of increase at the industry level during the 1980s. We then convened an expert panel of ten California health care professionals (including physicians, hospital administrators, and health policy analysts) to rank these 40 services on a seven-point Likert-type scale, from the least to the most innovative. Averaging the panel members' ratings yielded 15 services ranked as at or above the median scale level in innovativeness (Cronbach's $\alpha = .82$).

The bundle of 15 innovations included 6 technical innovations (laser surgery, ultrasound imaging, magnetic resonance imaging, fiberoptic endoscopy, cardiac catheterization, and computer axial tomography) and 11 administrative innovations (home hospice care, in-house and freestanding ambulatory surgery, pharmacy unit dose system, home nursing, alternative birthing center, home social services, home physical medicine, and adult day health center). Overall, there was strong consistency between the innovations identified using this method and hospital service innovations identified in prior research. Of the 12 innovations identified by Meyer and Goes (1988), 5 were present in our sample. Moreover, by studying a representative bundle of 15 service innovations, we gained an aggregate picture of innova-

tion within each hospital that was less susceptible to the influence of specific attributes of individual innovations.

Authors of some prior studies of innovation (cf. Fennell, 1980) have argued that an innovation's adoption in an organization is contingent on diffusion patterns of the innovation within its market. According to this view, hospitals often adopt a new service in order to maintain prestige and status following adoption of the service by competitors. To control for these bandwagon effects, we adjusted the dependent variable (service innovation). First, we determined the proportion of hospitals that had adopted each of the 15 innovations within specific hospital markets. Because they most accurately reflect local competitive conditions, we used the health services area classifications developed at the National Center for Health Statistics as the geographic unit of analysis for measuring hospital markets (Makuc, Haglund, Ingram, Kleinman, & Feldman, 1991). Every market area included at least two hospitals and at least one of the service innovations. Next, we adjusted each hospital's rating on a particular innovation for the level of diffusion for that innovation within the hospital's market and then aggregated these adjusted scores across the 15 service innovations to obtain the following overall hospital innovation score:

$$ASI_k = \sum_{i=1}^{15} \{SI_{k,i}/P_i\},$$

where

ASI_k = adjusted service innovation for hospital k,

$SI_{k,i}$ = the service innovation rating (0 or 1) for hospital k on the ith service innovation,

and

P_i = the proportion of hospitals in the market area that had adopted the ith service innovation.

In other words, a hospital's adoption score for each service innovation in each year was adjusted for diffusion of that service within the hospital's market area on an innovation-by-innovation basis. As a particular service innovation became more diffused in a particular market, it became less innovative for the purposes of this study, lowering the aggregate hospital innovation score, ceteris paribus.

Measuring the Independent Variables

Structural links (MHS membership) were tracked using data from the AHA annual survey of U.S. hospitals. This was a simple dummy indicator for hospitals that were a part of a multihospital system. About 49 percent of the sample hospitals were affiliated with systems. The other interorganizational link measures came directly from the data in CHFC disclosure reports.

Administrative links (contract management) was a dummy variable indicating that a hospital contracted for management services with another hospital. Approximately 12 percent of the sample hospitals relied on contract managers over the study period, a figure generally consistent with national averages. *Institutional links* captured each hospitals' involvement in important institutional or trade associations such as the AHA or Voluntary Hospital Association (VHA). This variable was measured as the total dollar value (in thousands) of contributions made by a hospital to such organizations (we obtained similar results simply using the number of industry organizations to which a hospital made a nontrivial financial contribution as an indicator). Finally, *resource links* were measured as the total dollar value of major transactions (adjusted for hospital size) between a hospital and all other hospitals related through ownership or through key administrative personnel. Related hospitals were those in which ownership was shared, and related personnel were owners, board members, and managers who held interlocking administrative or ownership interests in both organizations. We used the presence of relation as evidence of interorganizational governance, since many alliances involve interlocking administration or ownership. By aggregating these transactions, we obtained an indicator of the overall volume of network resource and equity flows.

Although prior studies of innovation have examined many types of innovation determinants, most studies have focused on environmental and organizational factors (Damanpour, 1991). In testing hypotheses on the relationships between interorganizational links and innovation adoption, we sought to control for the environmental and organizational contexts in which a hospital operates.

Drawing on prior research (Meyer & Goes, 1988), we measured three characteristics of environmental context: urbanization, affluence, and market concentration. Greater urbanization of a hospital's market environment is thought to increase overall demand for health services and the latest medical services. Greater affluence should generally increase available financing and patient demand for new and elective medical procedures. Possessing the latest technologies and services often brings greater status and legitimacy to a hospital. Since status and legitimacy are competitive advantages for hospitals, innovation is thought to be more common in competitive markets than in concentrated markets. The first two measures were county-based demographic data from the 1980 census, and the patient market for each hospital was defined as the county in which it was located. *Urbanization* was the percentage of a county's population residing in urbanized areas, and *affluence* was the average county household income. We measured *market concentration* by the Hirschman-Herfindahl concentration index (Scherer, 1980),

$$\sum_{k=1}^{n} S_k^2,$$

where S_k is the market share, calculated in terms of hospital beds, for the kth hospital. We utilized the health service area classifications from the National Center for Health Statistics as the geographic unit of analysis for measuring market share.

We controlled for two major organization-level predictors of innovation: size and ownership. Larger hospitals are more likely to have the resources and "critical mass" necessary for innovation development. We measured hospital *size* as the average number of patient beds. We used a logarithmic transformation to adjust for curvilinearity in the size-innovation relationship (Kimberly & Evanisko, 1981).

We controlled for organizational type through an ownership variable (Damanpour, 1991). Ownership has particular relevance for hospitals (Goodstein & Boeker, 1991) and has often been found to covary with hospitals' strategic actions (Fennell & Alexander, 1987). Hospital *ownership* reported in the CHFC data varies across three types: voluntary not-for-profit (including church-affiliated), proprietary (for-profit), and public. We predicted that proprietary hospitals would be more likely to innovate than not-for-profit voluntary hospitals because of the formers' greater strategic flexibility, need to capture attractive market positions, and sensitivity to the competitive forces that drive innovation. Conversely, public hospitals should be less likely to innovate than others, since their social mission as "provider of last resort" constrains their resources and thereby limits their innovative capacity. Finally, some prior studies have suggested that organizational *slack* influences the resources available for innovation (Damanpour, 1991). We used hospital performance (operating margin) as an indicator of slack, since better performers would generate more funds that could be used to purchase the latest technologies and develop innovative services.

Hypothesis Testing

For the purposes of hypothesis testing, we pooled the data from each year, obtaining a sample of 3,880 observations. We first generated descriptive statistics and Pearson correlations between the variables. Next, we conducted pooled cross-section, time-series multiple regression analyses to evaluate the influence of the predictor variables on innovation adoption. Since preliminary analyses using ordinary least squares (OLS) regression indicated potential serial correlation problems, we employed a first-order autoregressive time-series model using maximum likelihood estimation (Johnston, 1984). Appropriate checks for multicollinearity, homoskedasticity, and serial correlation were also conducted. Four regression models were tested. The base model (model 1) determined the influence of the control variables. Model 2 evaluated the influence of interorganizational link variables and included controls for contextual factors.

The decade of the 1980s was a period of considerable environmental change in the hospital industry, particularly in California (Meyer et al., 1993). Prior to 1983, hospitals largely operated in a fee-for-service environment, and government and private insurers fully reimbursed hospital

charges. In late 1983, two watershed regulatory events dramatically changed the hospital operating environment: implementation of a prospective payment reimbursement system for Medicare, and a shift to sealed-bid contracting for the California Medicaid plan. Coupled with major growth in managed care organizations in California, these events drove fundamental changes in hospital strategy. Since 1983, cost containment and managed care pressures have been the dominant forces in health care. These changes provide hospitals an incentive to cut costs in basic services and to simultaneously diversify into and specialize in new, unregulated services.

Therefore, we evaluated the longitudinality of the relationship between interorganizational links and innovation in split-sample analyses in models 3 and 4. Model 3 tested the hypothesized relationships between interorganizational links and innovation using a temporal subsample of observations, those from the period 1981–83, and model 4 used all observations from the period 1984–90. These split-sample analyses evaluate the effects of these major environmental changes on the relationship between interorganizational links and innovation. To disentangle the causal effect of interorganizational links on innovations, we also lagged values of the four types of interorganizational links by one year (preliminary testing revealed no significant results for lags of more than one year).

RESULTS

Table 1 presents the means, standard deviations, and Pearson correlations for the independent and dependent variables. Of the 11 bivariate relationships we expected between the independent variables and innovation adoption, 3 generated unexpected findings. Service innovation was negatively associated with contract management and was less likely in proprietary hospitals and more likely in public hospitals. The 9 remaining relationships found were consistent with theoretical expectations and prior empirical work. Table 2 presents the results of the regression analyses.

Our general proposition is that service innovations will be more likely in organizations that develop interorganizational links. Hypotheses 1–4 focus on the four specific types of interorganizational links in acute care hospitals: structural, administrative, institutional, and resource links. The California data provided strong support for our general proposition. As Table 2 indicates, a significant improvement in overall explained variance resulted from the introduction of the four interorganizational link predictors added in model 2. The adjusted coefficient of determination (R^2) for model 2 was .22, a significant change from the R^2 for the base model, which includes only control variables ($p < .001$). Moreover, all four types of interorganizational links were significant individual predictors of service innovation, albeit one relationship was opposite to the hypothesized direction. Innovation was more likely among hospitals using the structural link of membership in a multihospital system ($p < .001$), lending strong support for Hypothesis 1. Hypothesis 3 was also supported ($p < .001$), as the presence of institutional

TABLE 1
Descriptive Statistics and Pearson Correlations[a]

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12
1. Service innovation	10.70	8.67												
2. System membership	0.47	0.50	.11											
3. Contract management	0.12	0.32	-.10	.04										
4. Institutional links	26.60	98.00	.12	-.03	-.05									
5. Resource exchanges	136.10	267.50	.18	.31	-.07	.03								
6. Urbanization	85.00	21.50	.12	.13	-.19	.09	.21							
7. Affluence	17.70	2.54	.07	.07	-.06	.05	.16	.55						
8. Market concentration	0.08	0.10	-.11	-.12	.04	-.05	-.18	-.70	-.40					
9. Size	4.83	0.84	.40	.09	-.21	.18	.25	.48	.29	-.34				
10. Not-for-profit ownership	0.54	0.50	.06	-.48	-.01	.06	-.24	-.16	-.13	.20	.02			
11. Proprietary ownership	0.30	0.46	-.13	.40	-.04	-.08	.27	.27	.17	-.27	-.10	-.71		
12. Public ownership	0.16	0.37	.09	.15	.07	.02	-.02	-.11	-.04	.07	.09	-.48	-.29	
13. Slack	-0.02	0.24	.10	.04	-.03	.04	.08	.04	.02	-.02	.18	.02	.15	-.21

[a] Correlations $\geq$ .03 are significant at α = .05; r's $\geq$ .04 are significant at α = .01, and r's $\geq$ .05 are significant at α = .001. N = 3,880.

TABLE 2
Maximum Likelihood Estimates of the Effects of Interorganizational Links on Innovation Adoption[a]

Variable	Model 1	Model 2	Model 3	Model 4
Controls				
Urbanization	−.11***	−.12***	−.10	−.13***
	(.02)	(.03)	(.05)	(.03)
Affluence	.01	−.01	−.03	−.01
	(.01)	(.02)	(.04)	(.02)
Market concentration	−.06**	−.07**	−.04	−.08**
	(.02)	(.02)	(.05)	(.02)
Size	.42***	.37***	.36***	.36***
	(.02)	(.02)	(.04)	(.02)
Proprietary ownership	−.08***	−.15***	−.12**	−.16***
	(.02)	(.02)	(.05)	(.02)
Public ownership	.02	−.01	−.01	−.01
	(.02)	(.02)	(.04)	(.02)
Slack	.07***	.08***	.03	.09***
	(.02)	(.02)	(.03)	(.02)
Interorganizational links				
Structural links$_{t-1}$		.09***	.17***	.06***
		(.02)	(.04)	(.02)
Administrative links$_{t-1}$		−.04*	−.01	−.04**
		(.02)	(.03)	(.02)
Institutional links$_{t-1}$		.05***	−.03	.08***
		(.02)	(.03)	(.02)
Resource links$_{t-1}$		.08***	.07	.07***
		(.02)	(.04)	(.02)
R^2	.19	.22	.18	.24
ΔR^2		.03***	.03***	.02***
Durbin-Watson test statistic	1.99	1.99	2.00	2.00

[a] Standardized regression coefficients are shown; values in parentheses are standard errors.
[b] Boldface type indicates a significant variable of interest.
* $p < .05$
** $p < .01$
*** $p < .001$

links between hospitals and cooperative or trade associations was a strong predictor of innovation. Innovation was also more common among hospitals that exhibited high levels of resource links with hospitals related by ownership or key personnel ($p < .001$), supporting Hypothesis 4. Of the four types of interorganizational links that we studied in hospitals, only administrative links (contract management) failed to have a significant, positive effect on service innovation. Contrary to our expectations, the presence of a management contract was significantly and negatively related to innovation.

Controls for differences in environmental and organizational contexts were clearly related to service innovation, although sometimes in unexpected ways. Contrary to some prior findings, urbanization of the hospital market environment was negatively associated with innovation. Drawing on

prior research, we had predicted that hospitals that served affluent markets would be more likely to innovate, but no significant relationship between affluence and service innovation was found. However, the results indicate that hospitals in concentrated markets were less likely to innovate and that larger hospitals were much more likely to innovate. Greater organizational slack (performance) was also associated with service innovation. Privately owned for-profit hospitals were less likely to innovate than not-for-profit hospitals, an unexpected finding. There was also no significant difference in innovation between public and not-for-profit hospitals.

Longitudinal differences in the relationships between the interorganizational link variables and innovation were explored in models 3 and 4. Prior to the major regulatory events of 1983, structural links (MHS memberships) were the only significant interorganizational predictor of innovation. Indeed, the model 3 results indicate that hospital size and system membership were the primary forces acting on service innovation during this period of relative industry stability. Except for size and proprietary ownership (which had a negative effect in both periods), no other contextual variable was a significant predictor of innovation prior to 1984. These results contrast sharply with those of model 4. In the period following major regulatory change (1984–90), all four interorganizational link variables were significant in predicting innovation. Although the relative importance of structural links seemed to decline in the second period, the roles of institutional and resource links became much more important. Indeed, the percentage of variance in innovation explained by the model increased by a third in the second period. The influence of environmental and contextual variables grew as well. Demographic and competitive influences, as well as organizational performance, played a much greater role in explaining service innovation in hospitals during the period of environmental turbulence.

DISCUSSION AND CONCLUSIONS

Interest in the role that interorganizational links play in technology transfer and innovation has grown in recent years, but there have been few systematic empirical studies investigating this question. Prior studies have focused only on single forms of interorganizational links, and in so doing they have failed to capture the rich array of cooperative strategies that can be successfully brought to bear on complex problems like innovation.

This study evaluated the effects of four distinct types of interorganizational links on service innovation in hospitals. We found that hospitals that linked into multihospital systems, regularly exchanged resources with related hospitals, and aggressively built institutional affiliations were more likely to adopt innovative services and technologies. These findings confirm that interorganizational links can provide *efficient* conduits for exchanges of technological capabilities and knowledge between hospitals, can enhance hospital leaders' understanding of environmental trends, and can bestow legitimacy on the pursuit of innovations. This is an important contribution

to understanding the effects of interorganizational links on macrolevel out-
comes like innovation.

Findings for Types of Links and Contextual Factors

Structural links. Structural links often take the form of new governance
structures devoted to stimulating and rationalizing the linked activities of
organizations. One of these activities is the development of innovative ser-
vices and technologies. Our data show nearly 20 percent higher innovation
rates for multihospital system member hospitals than for hospitals that were
not system members. This finding supports the belief that structural links
bring hospitals greater awareness of and exposure to new technologies and
administrative systems, greater access to know-how and learning gained by
other system members, and greater access to the resources needed for inno-
vation. Our field interviews with hospital CEOs validated this finding and
suggested that innovations often spring from efforts to integrate services
among system hospitals.

Of particular interest is the dominant influence of system membership
on innovation during a period of relative industry stability occurring prior to
regulatory changes in late 1983. In the turbulent hospital industry environ-
ment that followed these changes (and continues to this day), system mem-
bership played a significant, but less important, role. Structural links may be
more effective in enabling macro processes like innovation during periods of
relative stability, when partners can devote more time and effort to building
and elaborating governance structures. As environments grow more turbu-
lent, more dynamic methods are more effective. This formulation is consis-
tent with the arguments of Miles and Snow (1984, 1986), who contended that
"dynamic networks" work particularly well in turbulent, high-velocity en-
vironments.

Administrative links. Contract management is a widely used adminis-
trative link between hospitals. However, our results showed a negative re-
lationship between such links and innovation adoption in California hospi-
tals, especially after the major regulatory changes in 1983. The finding im-
plies that administrative coupling is insufficient to overcome the barriers to
innovation in firms and may indeed dampen individual hospitals' efforts to
innovate. A primary virtue of an administrative link like contract manage-
ment is its ability to enhance interorganizational coordination and transfer
managerial competence without infringing on the autonomy and flexibility
of each firm (Provan, 1984). However, this virtue may become a vice when
it comes to innovation. Administrative ties provide an inadequate mecha-
nism for passing firm-specific capabilities (which often reside in routines)
between hospitals, perhaps because firms are unwilling to share valuable
innovation resources with partners whose autonomy remains largely unfet-
tered.

Institutional links. Developing links with important institutional and
trade associations had considerable influence on service innovation in Cali-
fornia hospitals, primarily during a period of relative environmental turbu-

lence. The findings support the notion that institutional links have several positive effects on innovation processes inside hospitals. They provide sources of information on new technologies, services, or administrative mechanisms, such as the fast-growing movement toward integrated, population-based delivery systems in hospitals. These links also reduce uncertainty among hospital executives about the legitimacy of new ventures, services, or administrative methods. For example, the American Hospital Association routinely conducts management seminars for member hospitals on innovative strategies like patient-focused care and physician contracting. Moreover, hospitals gain legitimacy by mimicking the actions of industry leaders (McKinney et al., 1991) and adopting administrative or technical innovations that are officially sanctioned by important institutional players and regulatory or accrediting agencies (Mohr, 1992).

As industry turbulence grows, uncertainty and competition make organizational performance more problematic. In the years following the regulatory changes of 1983, hospitals in California and nationwide experienced dramatic performance declines (Meyer et al., 1993). Such turbulence heightens the importance of institutional legitimacy. In a more competitive marketplace, it is essential that a hospital look good, possess the latest technologies, and offer cutting-edge services. Building institutional ties helps hospital executives to stay abreast of the latest trends, technology, and management practices and to build networks and alliances with other hospitals for the shared development and acquisition of innovations.

Resource links. We found strong and consistent evidence that a greater volume of exchanges between hospitals increases the likelihood that innovations will spread between them. Frequent exchanges lead to greater transfer of information and technical competence across networked organizations, more frequent interaction among them, and a greater involvement of personnel. Transactions that involve the highly embedded organizational or technical resources necessary for innovation are particularly prone to market failure. Resource links can overcome some of the failures of the open marketplace, lowering the costs and opportunism associated with these transactions, and thereby improving innovation outcomes.

Moreover, resource exchanges seem a more important predictor of innovation during periods of environmental turbulence. Through the 1970s, most hospitals competed as freestanding organizations. By the mid-1990s, few hospitals remained freestanding, and the vast majority were parts of multihospital systems or integrated health delivery systems. As involvement between partners grows, greater exchange of resources develops. One product of this growing exchange is the flow of knowledge and learning that engenders innovation.

Contextual factors. The relationships between contextual factors and innovation in the California sample generated results that contrasted with prior empirical work in the hospital industry (Meyer & Goes, 1988). Hospital size clearly had a dominant effect on innovation, as in prior studies (Kimberly & Evanisko, 1981). Although interorganizational links may provide

opportunities to overcome barriers to innovation imposed by size, larger organizations are still more likely to innovate. We conducted analyses of subsamples split by hospital size to further examine the role of size in the relationship between interorganizational links and innovations. The results indicate that hospitals exhibiting multiple and extensive interorganizational links were much more likely to be large and that large hospitals were consistently more innovative than small hospitals. Nonetheless, the presence of interorganizational links was directly associated with greater innovation among *both* large and small hospitals.

Limitations and Research Implications

This study has several important limitations. First, we concentrated on one population of health care organizations in one state (California). The health care industry is a very institutionalized environment (Mohr, 1992), which may be one reason why institutional links were a strong predictor of innovation. The presence of for-profit, not-for-profit, and publicly owned hospitals means that hospitals cannot routinely be expected to behave in an economically rational way. Medical innovation is often very complex, and innovation decisions are subject to budgetary, institutional, and technical criteria that are not always present in other business settings. In short, although the findings of this study should generalize well to other hospital settings, they will be less applicable to other types of firms.

Prior studies of innovation have shown considerable variation in results across different types of innovations, and the effects of interorganizational links on innovation may vary by innovation type. The differences between technical and administrative innovations are widely recognized in the literature (Damanpour, 1991), and Kimberly and Evanisko (1981) found size a much more important factor in technical innovation than in administrative innovation. We conducted preliminary post hoc analyses to investigate the robustness of our findings to differences between technical and administrative innovations. Although these results indicate that interorganizational links predicted both technical and administrative innovation, they had a much stronger effect on technical innovations. This issue merits further research.

Finally, the study also included only a limited array of possible interorganizational links, environmental factors, and organizational constraints that may face hospitals or other business organizations. As models 3 and 4 indicate, there is variation in the explanatory ability of our regression model over time, particularly before and after the 1983 implementation of major changes in hospital reimbursement policy. Further studies are also needed to better understand the temporal ordering of these relationships.

Our findings suggest some important directions for future research. First, studies are needed to further explore how the influence of interorganizational links on innovation differs by type of innovation. Future work should also expand the array of interorganizational link measures beyond the dimensions of structural, managerial, institutional, and resource ties.

Indeed, researchers would be well advised to study different options within each of these dimensions. The growth of managed care and vertical integration of health services have engendered new ways of linking hospitals with each other, with physicians, and with payers (e.g., insurers). These new interorganizational forms are most certainly worthy of further research.

Finally, interorganizational strategies may be traded off with organization-specific competitive strategies, and organizations that directly compete in similar niches may be less likely to cooperate. There is little research on how contextual circumstances interact with the form of interorganizational links to optimize innovation. Research comparing the types of interorganizational links and their fit to particular environmental or organizational dimensions is needed.

Conclusions

Oliver (1990) noted that various conceptual rationales have been used to explain interorganizational links. Our results contribute to the theoretical discussion by supporting several of these approaches. First, the strength of structural links suggests that creating collective governance structures stimulates innovation. Multihospital systems usually combine hospitals with differing market positions, competencies, strategies, and structures. These networks combine the strengths of multiple firms (Miles & Snow, 1986), allowing each to specialize in its resource-based competencies while efficiently sharing the competencies of partner firms (post hoc analyses indicated that multihospital system membership was positively correlated with hospital efficiency). This sharing of asymmetric competencies (Oliver, 1990) can play a powerful role in overcoming inefficiency in the innovation process, particularly during periods of relative environmental stability.

The significant relationship found between level of resource exchange among hospitals and service innovation implies that interorganizational links capture and rationalize the reciprocal exchange relationships between firms (Levine & White, 1961; Oliver 1990). As related firms expand these exchanges, innovative processes in member firms are enhanced. Much of this exchange is by design, but some innovations are likely passed between firms inadvertently through wider environmental scanning and spillover of ideas among personnel.

Finally, the significant relationship between institutional links and service innovation suggests that institutional ties help hospitals overcome resource dependence and grapple with institutional pressures. Institutional links were a strong predictor of innovation, particularly in a period of industry turbulence. This result is consistent with the predictions of Emery and Trist (1965) and of Cummings (1984), who argued that organizations operating in more turbulent environments will join forces to overcome uncertainty and negotiate a more stable competitive order. In the California hospital industry, the average level of institutional links increased dramatically after 1983, coinciding with substantial changes in hospitals' reimbursement environments. Coupled with the strong influence of institutional links

on innovation following 1983, these results suggest that institutional mechanisms are an important way in which hospitals manage environmental uncertainty while innovating.

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THE PERFORMANCE IMPACT OF STRATEGIC SIMILARITY IN HORIZONTAL MERGERS: EVIDENCE FROM THE U.S. BANKING INDUSTRY

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This study examined the impact of strategic similarities between target and bidder firms on changes in postmerger performance. Set in the U.S. banking industry, the empirical examination shows that mergers between banks exhibiting similar strategic characteristics result in better performance than those involving strategically dissimilar banks.

The recent acquisition of the media powerhouse Capital Cities/ABC by Walt Disney Corporation, the entertainment giant; the merger of Chase Manhattan Bank with Chemical Bank; and the takeover of Lotus by IBM are some high-profile events of significance that have revived interest in examining the use of mergers as a vehicle to secure competitive advantage. Although the concept of mergers is not really new, comprehension of its antecedents and consequences is still far from complete (Lubatkin & Lane, 1996). Research in the field of mergers and acquisitions has yielded significant insights into the advantages and disadvantages associated with each of the components of this array of corporate strategy options. For example, several studies have shown that some level of product-market relatedness between target and bidder firms is a desirable characteristic that can help postmerger performance (e.g., Kusewitt, 1985; Lubatkin, 1987; Singh & Montgomery, 1987). Others have demonstrated that compatibility in production technologies, organizational cultures, product functions, customer groups, and so forth has important performance implications (cf. Chatterjee, Lubatkin, Schweiger, & Weber, 1992; Hopkins, 1987; Shelton, 1988). These are but a few themes of a considerably larger body of work that has attempted to further understanding of mergers. Despite the concentrated research attention that mergers have received, most of the work has been limited to *comparative* evaluation of one form of merger over another (e.g., Chatterjee, 1986; Lubatkin, 1983, 1987; Singh & Montgomery, 1987). Very little effort has been directed toward understanding performance differences that occur *within* each type of merger. Thus, although some evidence suggests that, on the

average, related mergers outperform unrelated mergers, similar insights into why some related mergers succeed while others fail is lacking.

In this note, I attempt to overcome this shortcoming in the literature by focusing on horizontal mergers. Reporting a study set in the U.S. banking industry, I use the concept of strategic similarity to explain performance differences that arise following bank mergers. In a general sense, this study addresses the question, Why do some horizontal mergers succeed while others fail?[1]

THEORY AND HYPOTHESES

The Relatedness Hypothesis: Traditional Views

Mergers and acquisitions are arguably the diversification alternatives that have been the most widely researched in the corporate strategy literature. These studies have been rich and varied, often encompassing several distinct perspectives, including industrial organization economics (e.g., Ravenscraft & Scherer, 1987), strategic management (e.g., Chatterjee, 1986; Lubatkin, 1987; Singh & Montgomery, 1987), and finance (e.g., Choi & Philipatos, 1983). The general consensus arising from these studies, with a few exceptions, is that "all things being equal, some product and market relatedness is better than none" (Lubatkin, 1987: 39). Despite the established evidence relating to the performance outcomes of different types of merger, such as related and unrelated ones, very little is known about within-type performance differences. This gap in the literature can be partly traced to the conceptualization and measurement of relatedness. Although readily available and widely used, the Standard Industrial Classification (SIC) and Federal Trade Commission (FTC) classifications of mergers into groups such as horizontal, vertical, product, conglomerate, and so forth are limited in their ability to provide insights into the complex nature of relatedness (Lubatkin, 1983, 1987).

Frameworks such as the SIC system and the FTC merger classification scheme rely on commonalities in products, market, or both between a bidder and a target as the primary basis of classifying relatedness. Consider, for example, the mergers of C&S/Sovran Bank with NationsBank (formerly NCNB) and the merger of Manufacturers Hanover with Chemical Bank. These banks offer the same products—financial and banking services—to very similar markets, institutional and individual customers (Rogers, 1993). Given the similarity in their product domains, all four banks would be categorized within the same four-digit code (SIC 6025) and the mergers typed as horizontal mergers. Although such a categorization might not necessarily be faulty, it is nevertheless suboptimal since it cannot indicate why these merg-

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[1] A horizontal merger is a form of related merger that brings together two firms that are involved in the manufacture and/or sale of the same products and/or services. However, unlike the generalized classification of related mergers, horizontal mergers do not include any vertical growth or integration component (cf. Eckbo, 1980).

ers might have different degrees of success. These classification schemes provide an abbreviated framework for detecting the potential for product-related synergies, but they do not take into account other possible sources of synergy such as organizational strategy, culture, or management philosophy. For example, these approaches would not help explain whether the management style of Chemical Bank can act in tandem with that of Manufacturers Hanover, or whether the cost control orientation of NationsBank will be transferable to C&S Sovran Bank.

A few key studies have transcended the realm of sterile product-based definitions of relatedness to encompass critical organizational and strategic factors such as resource allocation patterns (Harrison, Hitt, Hoskisson, & Ireland, 1991), management philosophy (Datta, Grant, & Rajagopalan, 1991), and organizational culture (Chatterjee et al., 1992; Jemison & Sitkin, 1986; Nahavandi & Malekzadeh, 1993) in explaining postmerger outcomes. They show that valuable insights can be gained by broadening the conceptualization and operational definition of relatedness by stepping beyond the bounds of mere product-market considerations.

Strategy, Managerial Styles, and Resource Allocations: Alternative Views of Relatedness

Research in strategic management has repeatedly shown that organizations proactively design strategies to adapt themselves to the characteristics of their relevant external environments (Miles & Snow, 1978; Snow & Hrebiniak, 1980; Zajac & Shortell, 1989). Although these proactive strategies are firm specific, extensive empirical examinations have shown that common patterns of adaptive behavior recur. These frequently occurring patterns of behavior, referred to variously as generic strategies (Porter, 1980), strategic orientations (Miles & Snow, 1978), or strategic archetypes (Miller & Friesen, 1978) provide a standard approach for studying firm-specific features such as market orientation, risk propensity, and relative emphasis on cost control or innovativeness.

Strategy researchers have used resource allocation patterns as indicators of the underlying strategies that organizations pursue (Dess & Davis, 1984; Zajac & Shortell, 1989). For example, firms pursuing low cost strategies typically exhibit relatively lower levels of operational expenditure than other firms (Porter, 1980). Similarly, firms following strategies based on product innovation reflect higher levels of R&D spending. In essence, the core aspects of an organization's strategic direction are visible in the resource allocation decisions that top management makes. Consequently, if two firms exhibit very similar resource allocation patterns as measured across a variety of strategically relevant characteristics (e.g., risk propensity, marketing, efficiency), they can be considered to be strategically similar. This concept of strategic similarity can be particularly useful in studying the consequences of mergers. Its appeal lies in its ability to encompass a wide variety of organizational and managerial factors that go beyond the confines of product-market attributes.

Although many researchers have called for a transition from product-market approaches to more comprehensive conceptualizations of relatedness (cf. Jensen & Ruback, 1983; Salter & Weinhold, 1979; Shelton, 1988), the redirection of empirical effort toward that end remains sparse. Very few studies have attempted to recast the notion of relatedness to include factors of organizational, strategic, and managerial importance (cf. Chatterjee et al., 1992; Datta et al., 1991; Harrison et al., 1991). Chatterjee and colleagues (1992) examined the impact of "cultural fit" between the target and acquirer in a sample of mergers. Their results showed that mergers in which there was a match between the target and bidder on dimensions such as risk-taking attitude, reward orientation, innovation orientation, and autonomy orientation resulted in superior stockholder gains and that those that involved cultural mismatches did not perform as well. In a study conducted along similar lines, Datta and colleagues (1991) examined the performance impact of incompatibility in the management styles of acquirer and target firms. They found that inconsistency between the management teams of acquirer and target on factors such as decision-making approach, risk propensity, and time orientation was negatively related to postmerger performance. They reasoned that when mergers require an amalgamation of dissimilar management styles, a firm loses its ability to act in unison to realize the potential synergies arising from the merger, leading to poor performance. Thus, these two studies provide evidence that consistency in key elements of the managerial or subjective culture of merging organizations is an important driver of postmerger outcomes.

Harrison and colleagues (1991) also extended the traditional product-based definition of relatedness to encompass several key strategic variables. This effort used objective measures of resource allocation such as R&D intensity, administrative intensity, debt intensity, and capital intensity to measure relatedness. However, although these measures relate to potential synergies in operations, finance, and R&D, Harrison and coauthors found that *dissimilarities* between targets and bidders on these dimensions were actually positively related to postmerger performance. They suggested that these findings were probably a function of (1) synergies associated with uniquely valuable differences between the firms that bolster the competencies of the bidder, (2) the ability of the bidder to "leverage" the differences to respond to a wider array of environmental opportunities, and (3) the bidding process, which tends to inflate merger premiums for strategically similar targets, resulting in less than stellar benefits for the acquirer. Following a related vein, Harrison, Hall, and Nargundkar (1993) examined the performance impact of consistency in R&D resource allocations between individual lines of business comprising the portfolios of diversified organizations. Although this study did not deal with mergers, it nevertheless showed that allocation consistencies have a positive performance impact. Taken together, the few studies reviewed here show that the concept of relatedness can be extended beyond the traditional product-market confines to encompass a variety of

strategic dimensions and that new insights can be gained through such a redefinition.

Building on these studies, one can argue that mergers between firms emphasizing similar strategic characteristics will result in positive performance outcomes. For instance, if a firm competing on the basis of low cost and efficiency in operations were to merge with another organization with a set of similar competencies, the resultant firm would be better positioned to fully exploit the synergistic benefits of combining similar skills (Prahalad & Bettis, 1986). The cost control emphasis would become accentuated and lead to greater efficiencies, derived from better economies of scale and scope (Panzar & Willig, 1981; Post, 1994; Rose, 1989). Minimization of conflicts arising from disparities in core competencies would contribute to better performance (Chatterjee & Wernerfelt, 1988). Such performance outcomes would be difficult to achieve in mergers involving firms with widely divergent strategies (Lubatkin, 1983; Salter & Weinhold, 1979; Wernerfelt, 1984). Since divergence in strategic direction could indicate differences in the approaches that managements use to achieve competitive advantage, such variations might not be optimal. It is more likely that the postacquisition phase of such mergers will be characterized by conflicts and dissent regarding future courses of action. For example, management incompatibility might lead to opposing views on critical decisions such as eliminating redundancies arising from the merger, deployment of personnel, or rationalizing product lines (cf. Datta et al., 1991). Given their distinctly different strategic approaches, the management teams of the target and bidder would find it difficult to reach consensus on critical aspects of operations that are crucial for the realization of synergies. Although this could be equally true in horizontal mergers between strategically similar firms, the potential for conflict is relatively low in such instances. It must be acknowledged that in some types of mergers, such as conglomerate and vertical mergers, the particular objectives underlying a union might render dissimilarities preferable. For example, in the case of conglomerate mergers, complementarities might be beneficial since the merger might cut across industry lines, thus offering wider scope to "leverage" dissimilarities in strategies. Even in the case of vertical integration, strategic differences between a target and a bidder might not be so detrimental, since such a merger could involve two different settings where the requirements for success might vary (Harrison et al., 1991). However, in the case of horizontal mergers, the negative impact of strategic dissimilarity is likely to be significant. Research on "cultural incompatibility" also offers tangential support for the similarity hypothesis.

The notion of cultural incompatibility (Buono & Bowditch, 1989; Chatterjee et al., 1992; Nahavandi & Malekzadeh, 1993) has often been invoked to explain the negative performance outcomes associated with some mergers. Since "organizational culture is believed to permeate every aspect of organizational life . . . [such as] the types of decisions made in a firm, its organizational policies and procedures, and its strategy considerations" (Buono &

Bowditch, 1989: 142), it could be argued that differences between target and bidder in strategic characteristics will reflect underlying cultural differences. Further, since organizational strategy options are filtered through the lens of the prevailing culture (Buono & Bowditch, 1989; Nahavandi & Malekzadeh, 1993), mergers between strategically dissimilar firms would include some level of cultural mismatch as well. Consequently, these differences would render integration efforts difficult to implement and limit the possibility of harnessing potential synergies. However, the impact of strategic dissimilarities and attendant cultural differences on postmerger performance might vary across merger types. For example, horizontal mergers involve a much closer and intensive interaction between the bidder and target organizations than do conglomerate mergers (Nahavandi & Malekzadeh, 1993), and therefore, cultural mismatches might have greater consequences in horizontal mergers. In essence, strategic differences may be manifestations of underlying cultural differences and hence less desirable.

Prahalad and Bettis (1986) used the concept of "dominant logic" to reach similar conclusions. They suggested that members of the top management team of an organization share a dominant logic that arises through shared experience and organizational learning. This dominant logic is defined "as the way in which managers conceptualize the business and *make critical resource allocation decisions*—be it in technologies, product development, distribution, advertising, or in human resource management . . . stored as a cognitive map (or set of schemas) among the dominant coalition . . . expressed as a learned problem-solving behavior" (1986: 490–491). Building on this concept, they argued that the dominant logic plays a critical role in the manner in which an organization utilizes its resources and achieves competitive advantage since it constantly filters managerial action and colors all top management decisions. Thus, the ability of top management to manage its acquisitions is viewed as a function of the extent to which the logics of a target and a bidder are similar. Since strategic similarity presupposes the existence of similar dominant logics (Harrison et al., 1991, 1993), mergers between strategically similar firms are likely to provide greater benefits than mergers involving organizations pursuing dissimilar strategies. Further, such mergers limit the need to develop and maintain multiple logics, change existing logics, or resolve cognitive conflicts that could arise from merging strategically dissimilar firms—all processes that are long drawn and difficult to implement (Kiesler & Sproull, 1982; Prahalad & Bettis, 1986). Hence, the dominant logic approach also favors strategic similarity as a precondition for achieving better postmerger performance. Thus, it can be hypothesized that:

> *Hypothesis 1. Mergers between target and bidder firms emphasizing similar strategic characteristics will result in better performance than mergers between targets and bidders emphasizing dissimilar strategic characteristics.*

An important feature of the above hypothesis is its treatment of strategic

characteristics. Although these characteristics (e.g., risk propensity, marketing emphasis, operational efficiency) do indeed represent distinct areas of an organization's operations, they are treated as a collective construct for two reasons. First, most of the literature on strategy depicts a firm's strategic posture as a composite of key strategic attributes (e.g., Miles & Snow, 1978; Miller & Friesen, 1978; Porter, 1980). Thus, it is quite difficult to untangle the aggregate picture to determine the relative importance of each element comprising a firms' strategy since there is little theoretical precedent to enable such a process. Consequently, any prioritization of the strategic variables is more of an empirical issue. Second, the hypothesis suggests an overall negative effect when there is a mismatch in the strategic characteristics of a target and a bidder. It is based on the premise that matches lead to the creation of value through the realization of synergies and that mismatches, irrespective of the characteristic, undermine performance since they do not foster synergy. Given these reasons, I do not present separate theoretical hypotheses for each strategy construct constituent.

METHODS

Testing of the hypothesis was carried out on a sample of mergers that occurred in the banking industry. Secondary objective data spanning a period of seven years (1984–90) were used. I employed hierarchical regression analysis to examine the performance impact of similarities between target and bidder on a variety of strategic attributes.

Research Setting and Sample

Banking has historically remained one of the most highly regulated industries in the United States. Mergers, branching, and interstate expansion have been heavily regulated by federal and state government agencies for a substantial part of this industry's history. However, banking has been witnessing important changes since 1980 (Hawawini & Swary, 1990; Rose, 1989), when the Depository Institutions Deregulation and Monetary Control Act (DIDMCA) was passed. This act reduced the level of regulatory oversight in the industry by setting aside interest rate ceilings, increasing federal deposit insurance, and rationalizing reserve requirements, changes that infused a degree of competitive vigor (Rose, 1989; Roussakis, 1989). Soon mergers became a viable growth option in the banking sector. Thus, this industry provided the ideal setting for examining the role of strategic similarity in influencing postmerger success within a single environment.

The sample included all intrastate mergers involving Federal Deposit Insurance Corporation (FDIC) member banks consummated in 1987. The choice of the time frame, 1987, was primarily driven by sample availability constraints. Starting with 1981, the year following the passage of DIDMCA, I analyzed the frequency of mergers over successive one-year periods. It was my intent to determine an optimal year that would yield a reasonably large sample of mergers involving banks that were not parties to other mergers for

a three-year period either before or after a single merger event. The analysis showed that 1987 provided the largest sample that met the above criterion. Before making a final choice of time frame, I examined trends in the funda- mental features of the banking industry, such as deposits, loans, employ- ment, interest income, and profitability. The finding that there were no sharp variations on these critical parameters supported the choice of 1987 as the focal year.

To be included in the sample (1) both the target and the bidder bank had to have been independent entities at the time of the merger and (2) the bidder had to not have been involved in any merger for the three years prior to 1987 and the three years after 1987. These criteria enabled the precise examina- tion of the effects of a single merger in isolation (Choi & Philipatos, 1983; Lubatkin, 1987), avoiding any extraneous influences. A final sample of 46 mergers (comprising 92 banks) meeting these conditions was identified. Of these 46 mergers, 43 involved banks operating in the same county. The other three cases involved banks operating in neighboring counties within the same state. Hence, for the most part, the competitive conditions faced by the targets and bidder can be assumed to have been quite similar.

Data and Measures

Objective secondary data relating to both target and bidding banks were collected for the period 1984–90. Most of the data used in the analysis were obtained from the annual compilations of *The Bank Quarterly* and statewide annual reports of banks published by Sheshunoff Information Services. This information was supplemented with data obtained from the Call and Income Reports filed by each FDIC member bank and the *Data Book—U.S., States, Counties, Other Areas*, an FDIC publication.

Measuring Strategic Characteristics through Resource Allocations

The strategic orientation of an organization reflects the pattern of re- source allocation decisions that top management makes in navigating the firm through the multitude of environmental constraints to achieve competi- tive advantage. Within the context of the banking industry, these decisions relate to five broad areas of importance: market coverage, marketing posture, risk propensity, operational efficiency, and client mix (Bowden, 1980; Rose, 1989; Roussakis, 1989). I measured these areas using a set of five ratio indi- cators. The measures (1) encompassed domains of decision making that were largely within the purview of bank managers, (2) captured key aspects of resource allocation that are specifically relevant to the banking industry, and (3) characterized observable aspects of realized strategies that have been demonstrated to influence bank profitability.

Market coverage. The number of branches that a bank operates within a territory is an important element of strategy that affects its competitive effectiveness. Although some banks operate a relatively large number of branches to improve the level of service they offer their clientele, others concentrate operations in a smaller number of branches to control costs.

Both approaches have their own unique benefits, but the choice nevertheless reflects the underlying approach that a bank's management is pursuing to realize competitive advantage, hence an element of overall strategy. A bank's market coverage was measured as the ratio of the number of individual branch facilities that it established in a given county to the total number of branches that all banks operated in that county.

Operational efficiency. The analysis of operating cost is seminal to understanding the dynamics of operating synergies that acquirers might be able to realize. In banking, these synergies arise from integrating backroom operations that process individual financial transactions, information systems that track loans, deposits, and customer data, rationalizing branching structure, and the ability to spread these costs over a larger deposit base given the merger of the acquirer's operations with the target. Since operational costs reflect the relative efficiency (or inefficiency) of a firm's systems, their analysis provides valuable insights into management's operations philosophy and consequently the potential for postmerger efficiency gains. This attribute was measured as a ratio of overhead expenditure to total bank revenues (overhead/revenues), an indicator that is often used in banking studies (cf. Hawawini & Swary, 1994; Rose, 1989).

Emphasis on marketing activity. Marketing is widely acknowledged as an adaptive boundary-spanning function indicative of the extent of the external focus of organizations (Miles & Snow, 1978; Porter, 1980). Although some organizations place a significant emphasis on marketing by using a wide array of advertising and sales promotion campaigns, other firms set aside much smaller outlays for pursuing marketing activities. Researchers have argued that this differential emphasis is a fundamental indicator of strategic differences between firms. I used the ratio of marketing expenditure to total bank revenues (marketing expenditure/revenues) to measure this element of bank strategy.

Client mix. Banks face a lot of choices in terms of the clientele they wish to attract. Some banks position themselves as "wholesale" banks by focusing primarily on commercial and industrial customers, and others shape themselves as "consumer" or "retail" banks by emphasizing individual consumers. This dichotomy between wholesale and retail banking is fundamental to any analysis of bank strategy (Compton, 1991; Rose, 1989; Stemper, 1990), since the nature of skills and resources associated with each type of operation differs significantly. On the one hand, servicing a large consumer clientele might necessitate higher levels of expenditures for branch operations and processing costs, given the large volume of transactions that are likely to be encountered. On the other hand, wholesale banking requires fairly high levels of core capital, a sophisticated sales force, and a much larger battery of financial analysts for evaluating creditworthiness (Hempel, Coleman, & Simonson, 1986). The ratio of business loans to consumer loans (Bowden, 1980; Rose, 1988) was used to capture each bank's client mix.

Risk propensity. The top management team of a bank has significant control over the level of asset risks that the bank assumes. The level of core

capital that is set aside for making loans exemplifies management's degree of aggressiveness. Conservative banks ensure that they have a large cushion between the volume of capital and the volume of loans outstanding, and aggressive banks push their lending volume to the maximum limit that is feasible within the general guidelines established by the FDIC. Bank analysts use a ratio of core capital to loans outstanding as an indicator of a bank's risk propensity (e.g., Rose, 1988).

Measuring Performance

Profitability measure. I measured performance using accounting measures of profitability since some surveys of merger decisions have indicated that managers primarily seek to improve profitability through mergers (Ingham, Kran, & Lovestam, 1992; Rose, 1989). Both ex ante and ex post outcomes were measured over a three-year period. It can be argued that three years is not long enough for synergistic gains to materialize, but I was forced to limit the time frame to three years because a significant proportion of banks in the sample had further acquisitions beyond that point. Therefore, adding additional years, samples, or both would have violated the "clean data" criterion suggested by Choi and Philipatos (1983) and Lubatkin (1987).

Meeks and Meeks (1981) observed that of all the accounting measures of profitability, return on assets (ROA) is the least sensitive to the upward or downward estimation bias that can be induced by changes in leverage or bargaining power resulting from a merger. They suggested that these biases can be further minimized if the merger year is dropped from computations of profitability since it is difficult to pinpoint an exact date on which the accounts of both target and bidder were combined. Ex ante performance was derived as the revenue-weighted mean of the ROA of both a target and a bidder firm over a three-year period (1984–86) preceding their merger. As Harrison and colleagues observed, "Combining statements in the preacquisition period overcomes the bias toward attributing merger related success or failure to performance differences that would have existed even if a merger had not occurred" (1991: 181). Ex post profitability of the bidder was computed similarly, but for the 1988–90 period. Change in performance following the merger was the difference between premerger and postmerger performance.

The statistical literature (e.g., Allison, 1990; Cohen & Cohen, 1983; Cronbach & Furby, 1970) identifies two potential problems when change scores are used. First, there is the problem of "floor/ceiling" effects, which relates to the magnitude of change. Banks that were performing well prior to a merger might not be able to improve their performance as much as the low performers simply because their base rate of performance was higher. Second, the prechange value is invariably correlated with the postchange value. Therefore, using the magnitude of change as the dependent variable could lead to spurious effects if the model does not account for the ex ante effect. Although in this specific case, the correlation between pre- and post-

merger performance is logical, as a matter of precaution, I felt it prudent to use the premerger value as a control variable. Cohen and Cohen (1983) observed that such a control considerably alleviates the problem of naturally occurring correlations between pre- and postscores.

Control variables. Two control variables, namely, weighted average premerger ROA (premerger performance) and the size of a target vis-à-vis the bidder (relative size) were used in the analysis. Relative size was used as a control variable since prior research shows that larger firms might acquire smaller firms to realize scale-related synergies that would otherwise be difficult to obtain (Datta et al., 1991; Kusewitt, 1985). Hence, irrespective of strategic similarities or dissimilarities, the size differential might explain some variance in postmerger performance. Although it would have been ideal to use additional controls, such as the basis of the merger payments (cash or stock), and whether or not the merger was contested, such data were not readily available from the FDIC or other regulatory agencies.

DATA ANALYSIS

Prior to examining the central hypothesis of the study, I performed a correlation analysis of key variables intended to help me choose the appropriate analytical technique. The pattern of correlations among the strategy variables revealed statistically significant relationships between these indicators. Since the magnitudes of the correlations were quite high, it was apparent that some of the independent variables were multicollinear.

To overcome this shortcoming, I analyzed data using a hierarchical regression approach. It is a preferred analytical technique since it explicitly accounts for any overlap in the explanatory power of the independent variables.

Hierarchical Regression Analysis

The mean scores of each bank on all five measures were first computed for the period 1984–86. I determined difference scores on each of these measures using the distance metric proposed by Drazin and Van de Ven (1985). This metric computes the absolute value of the difference between two entities on a given characteristic as $\sqrt{(X_{Bs} - X_{Ts})^2}$, where X_{Bs} is the score of the bidder on the sth variable and X_{Ts} is the score of the target on the same variable. The difference measures corresponding to the five strategy variables were used as independent variables, regressed against change in performance following the merger.

The control variables, premerger ROA and the size of a target compared to a bidder (relative size), were entered first. The independent variables were then entered one at a time. Since there was no theoretical rationale for determining the order of entry of the independent variables, there was no need to use any preordained sequence.

RESULTS

The results of the hierarchical regression analysis provide general support for the study's hypothesis. Strategic dissimilarities between target and

TABLE 1
Univariate Statistics and Correlation Matrix for Explanatory Variables

Variable	Mean	s.d.	1	2	3	4	5	6	7
1. Market coverage	0.11	0.14							
2. Marketing expenditures/ revenues	3.57	1.61	-.23						
3. Risk propensity	10.09	2.76	-.11	.43**					
4. Overhead/revenues	9.64	3.86	-.27	.82***	.44**				
5. Client mix	53,739.4	112,502	-.15	-.08	.12	-.05			
6. Premerger performance	2.51	10.82	.30	-.67***	-.45*	-.84***	.03		
7. Postmerger performance	6.87	11.36	.27	-.85***	-.49*	-.67***	.22	.63***	
8. Relative size	4.60	3.65	.07	-.15	.06	.55***	-.02	.19	-.14

     * $p < .05$
     ** $p < .01$
     *** $p < .001$

TABLE 2
Results of Hierarchical Regression Analysis of Strategic Dissimilarities and Change in Performance Following Mergers[a]

Variable	Model 1	Model 2
Control variables		
Relative size	−0.08	−0.05
Premerger performance	−0.45**	−0.80***
Strategy variables		
Market coverage		0.03
Overhead/revenues		−0.19*
Marketing expenditures/revenues		−0.30**
Client mix		−0.27*
Risk propensity		−0.23*
Model R^2	0.18	0.47
ΔR^2		0.29
F	5.56***	6.19***
Chow's ΔF		19.81***

[a] Model 1 includes the control variables only. Model 2, the complete model, includes both the control and strategy variables.

* $p < .05$
** $p < .01$
*** $p < .001$

bidder firms did have a negative influence on performance following mergers.[2] The control variable representing size differences between the target and bidder banks was not significant. However, the other control variable, premerger ROA, was significant, explaining 18 percent of the variance in performance change following the mergers. This finding is consistent with the relatively high correlation ($r = 63$) between pre- and postperformance measures. It is also in line with some of the previous studies on mergers and acquisitions that have reported significant effects for ex ante performance indicators (see, for example, Harrison et al. [1991] and Rose [1988]). The negative sign on the ROA coefficient is explained by the fact that the dependent variable is a change score derived as the difference between postmerger and premerger ROA and hence reflective of the floor/ceiling effects discussed earlier. In other words, since banks that were performing well prior to the mergers cannot be expected to improve their performance as much as banks that were performing poorly, the negative link is logical. The five-measure set of strategy variables explained 29 percent of the variance in performance change following a merger. This finding makes a persuasive

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[2] Addressing the robustness of the findings, an anonymous reviewer suggested that the analysis be repeated with standardized strategy variables. I used Fisher's Z transformations for this purpose prior to deriving the difference scores. These scores were then used as the independent variables in the analysis. The pattern of results was similar to that obtained using unstandardized variables.

case for using strategy indicators to characterize bidder-target relatedness in studies of postmerger performance.

DISCUSSION

The results of the hierarchical regression analysis demonstrate the ability of strategic variables to explain variance in postmerger performance changes. They provide evidence that similarities in strategic characteristics, reflected by consistency in the resource allocation patterns of bidder and target firms, have a positive influence on postmerger performance. Differences between target and bidder on important elements of bank strategy, such as risk propensity, marketing emphasis, operational efficiency, and mix of clients, were found to be detrimental to performance change following a merger. Some of these findings are discussed below.

The findings regarding marketing emphasis and operational efficiency underscore the negative effects of dissimilarity. They show that differences between target and bidder banks in their orientation toward operational efficiency have an adverse impact on performance change following a merger. It is plausible that when an efficiency-oriented bank takes over another that emphasizes customer service as an important aspect of its overall strategy, the resultant organization is likely to be stifled by the acquirer's imposition of its own cost control and monitoring systems. This could hamper the target's focus on service in several ways. For example, the acquirer might seek to impose cost discipline by trimming the number of branches it operates, eliminating personalized customer benefits, and reducing overall service levels. These measures would be counterproductive for the target's side of the operations, which had relied on extensive branch operations and customer extras as part of its drive toward superior customer service. The scale-related synergies that were expected would not materialize easily in such a situation.

Dissimilarities in the client mix served by a target and a bidder had a negative performance impact, as expected. It is plausible that the limited complementarities between the banking industry's wholesale segment (commercial banking) and its retail segment (consumer banking) do not generate sufficient synergies to exert a positive impact on performance. Retail-oriented banking requires a set of skills and competencies that are quite different from those required to run a profitable wholesale banking operation. For example, the sheer volume of individual customers served by a retail bank translates into significant demands for service-oriented infrastructures and varying levels of capital exposure, cost control, and marketing intensity that are not paralleled in wholesale banks. In essence, the fundamental principles of managing a portfolio of consumer loans and services might be quite different from the approach to wholesale banking, so merging the two types might not help realize adequate synergies. Rose reinforced this contention, observing that a significant number of bank mergers fail because "acquirers seek the wrong 'fit' in terms of an acquisition target—A whole-

sale-oriented bank may reach out for smaller retail banks, only to find that it lacks the management techniques and professional skills to control its acquisitions and keep their earnings growing" (1989: 143).

The negative performance consequences of incompatible risk patterns is supported by prior studies on organizational culture and leadership. Several studies in these areas have shown that CEOs who exhibit a high level of risk propensity are not ideal candidates for the leadership of conservative organizations (e.g., Thomas, Litschert, & Ramaswamy, 1991). Extending this notion to the organizational level, it would be defensible to argue that the takeover of a conservative bank by an aggressive one is likely to be fraught with difficulties because the risk-prone management of the bidder would find it difficult to persuade the executive cadre of the target to unlearn this conservative stance. Further, the bidder would find it difficult to take advantage of the skills that it has honed under risk-prone conditions. The findings of Chatterjee and colleagues (1992) support this conclusion. They found that cultural incompatibility between target and bidder, measured as a function of risk-taking attitude, among other things, was negatively related to postmerger outcomes. Other researchers have also suggested that such fundamental differences do manifest themselves during the process of acculturation when target and bidder firms are integrated (e.g., Buono & Bowditch, 1989; Datta et al., 1991; Nahavandi & Malekzadeh, 1993), and the resulting conflicts undermine the realization of promised synergies that fueled the merger.

The findings relating to the performance effects of differences in market coverage did not support the overall hypothesis of declining performance in the face of dissimilarities. It is probable that this is a reflection of the typical branching structure of the banks that formed the sample. Previous studies have shown that in the banking industry, bigger bidders prefer small bank takeovers (Hawawini & Swary, 1990) since economies of scale can become significant even at comparatively lower levels (<$ 100 million in deposits) of operations (Clark, 1988). Hence, these results could be mirroring the drive to increase the size of operations to the minimum threshold level at which economies of scale start to come into play. Since most of the banks in the sample had relatively modest branching structures, it is probable that any increase in size that resulted from a merger could have been desirable.

Although the present results are internally consistent, they contradict findings reported by Harrison and colleagues (1991) and discussed earlier. In a multi-industry examination of mergers occurring over a 20-year (1970–89) period, they found that dissimilarities, *not* similarities, in R&D, asset, administrative, and debt intensities were positively associated with postacquisition performance. The divergent findings can be partly traced to the fundamental differences in the contexts that these studies explored and the types of mergers that were the subject of examination. In contrast to Harrison and colleagues (1991), who examined a multiplicity of manufacturing industries, this study used a single service industry as its research site. It is possible that the relative homogeneity of the recipe for success in banking might

not favor the realization of synergistic benefits arising from complementarities in the resources of target and bidder. In the more heterogeneous manufacturing sector, such complementarities might, however, be valuable. Further, the extent to which their context allows mergers to be contested could also explain differences in findings. The sample used by Harrison et al. was largely composed of industry contexts in which contestability was feasible, but the case was quite different in the banking industry that was used in this study. For example, during the period of the study, banks headquartered in 14 of the 20 states that constituted the sample imposed constraints on branching. Although some states allowed limited intrastate branching, others only permitted unit branching, thereby eliminating establishment of multiple full-service banking facilities. Hence, the regulatory framework might have limited the possibility of an auction among equally interested bidders for a single target. Consequently, it might not have been necessary for a bidder to choose a strategically dissimilar target or search for private synergies to avoid significant premiums, a situation common in settings in which mergers can be easily contested.

The specific types of mergers examined by the two studies could also have a bearing on the contrasting results. Harrison and colleagues (1991) examined related and unrelated mergers; this study, however, was limited in its focus to horizontal mergers only. Although the related category used by Harrison and colleagues (1991) would be the closest to the horizontal category used here, they are not fully comparable. Unlike related mergers, horizontal mergers do not include any vertical component.[3] Consequently, in contrast to horizontal mergers, the related type as defined by Harrison et al. might actually benefit from resource complementarities rather than from similarities, because of the vertical component. It is plausible that while Harrison and colleagues identified the key resource allocation parameters on which differences are desirable, this study uncovered areas in which similarities add value. Hence, the possibility of differences on certain dimensions complementing similarities in others must await further examination.

Despite the caution and diligence exercised in developing the design for this study, it is not without limitations. For instance, the use of objective strategy characteristics does not allow the characterization of intended strategies. Some researchers would argue that intended strategies are critical since they embody the objectives behind a merger. Further, the relatively short time frame used in the study might not have allowed acquirers to

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[3] For example, using two-digit SIC codes as the indicator of relatedness, a merger involving a firm in SIC 3510 (engines & turbines) and another in SIC 3523 (farm machinery) would be classified as a related merger. However, it could have a vertical component if an engine manufacturer were to acquire a firm manufacturing farm equipment, such as tractors, or vice versa. Another example would be a merger between a firm in SIC 2800 (chemical & allied products) and another in SIC 2834 (drugs & pharmaceutical). Here, too, there could be vertical integration forward or backward because fine chemicals manufactured by the firms in SIC 2800 form the feed stock for the pharmaceutical firms classified under SIC 2834.

realize all the synergies associated with the mergers. This design limitation, meant to enhance internal validity, does indeed limit generalizability. It is also conceivable that the particular mode of integration chosen by an acquiring firm could have a bearing on postmerger performance. One firm might choose a hands-off approach and maintain autonomy for a newly acquired target; another might choose to fully integrate the operations of the target so that its original identity is completely absorbed into the bidder's operations. These alternative integration approaches can have important performance consequences that this empirical effort did not consider.

This study provides strong support for the dominant school of thought that emphasizes similarities in strategic characteristics as a precondition for superior postmerger performance. Results suggest that analyzing the congruence between target and bidder on key strategy features might be a useful approach to understanding the concept of relatedness. In contrast to conventional approaches that rely entirely on product-market attributes, the use of other strategically relevant factors extends the realm of relatedness to encompass crucial areas of operations in which matching managerial skills and competencies could add value (Prahalad & Bettis, 1986). These insights are likely to be lost if an aggregate approach, such as one based on SIC codes or FTC categories, is used instead.

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THE SELECTIVE PERCEPTION OF MANAGERS REVISITED

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Results of a systematic replication of studies by Dearborn and Simon and by Walsh suggest that differences in their conclusions resulted from differences in their experimental procedures. Managers are broader perceivers when they are encouraged to identify more problems. Also, contrary to Walsh's and others' theories, in this replication belief structure did not mediate the relationship between functional experience and selective perception. In addition, predominantly negative relationships were found between areas of experience and perceptions, indicating that functional experience may produce selective *imperception* as well as selective perception.

Organizational researchers agree that many important decisions taken in organizations involve complex and ill-structured problems likely to be affected by managers' personal cognitive processes (Hambrick & Mason, 1984; Mintzberg, Raisinghani, & Théorêt, 1976; Starbuck & Milliken, 1988). An early, widely cited empirical study showed managers' "departmental identification" was related to the types of problems they identified in a case (Dearborn & Simon, 1958: 140). This finding has been interpreted as evidence that functional experience selectively channels the perceptions of managers when they solve complex problems.

Walsh (1988) replicated and extended the Dearborn and Simon study,

postulating that functional experience was incorporated in managers' belief structures, which served as a cognitive filter that narrowed their perceptions toward related information. He found that (1) the content of managers' belief structures was often broader than their functional experiences, but (2) there were only a few scattered relationships between the content of their belief structures and their information processing.

Although the results of these studies have been interpreted as reflecting "selective perception," these studies actually measured this construct in a special, limited sense. Both sets of researchers operationally defined selective perception only in terms of its *direction*. They assumed that selective perception is manifested in information processing directed at content that matches current functional role or functional experience because familiar content is most meaningful to the perceiver (Lord, 1985). They did not focus on the actual selectivity of the perception—that is, the *breadth* or narrowness of subjects' information processing. This limitation is especially curious in the second study, since Walsh did compute a measure of the breadth of his subjects' functional experience. The same logic should be applied to perceptions that he applied to functional experience. Clearly, the most basic concern in measuring managers' selective perception should be whether the managers are general, broad perceivers or specialized, narrow perceivers. The issue of where they direct their perceptions is logically secondary.

The study reported here was undertaken as a systematic replication (Aronson, Ellsworth, Carlsmith, & Gonzales, 1990) and extension of the Dearborn and Simon (1958) and Walsh (1988) studies. As Aronson and colleagues defined it, a systematic replication is "a repetition of an experiment in which the experimenter systematically varies some aspect of the original conditions, procedures, or measures in order to resolve ambiguities or add new information . . . and provide for a clarification or extension of original findings" (1990: 351). They argued that systematic replications "are invaluable for uncovering the source of inconsistent results and can ultimately enhance our understanding of conceptual variables" (Aronson et al., 1990: 55).

These quotations express the purposes of the present study. The methods of the two replicated studies differed in one crucial respect: Dearborn and Simon instructed respondents to identify the most important problem in a case; Walsh instructed respondents to identify as many problems as they considered important. Because the first method gave respondents a more limited observational goal (Dweck & Leggett, 1988) than the second, it is not surprising that managers responded as more selective perceivers in the first study than in the second. In addition, Walsh's study included a possible confounding factor—priming effects (Fiske, 1993). By asking subjects to describe their belief structures before analyzing the case, Walsh made their beliefs salient and thus likely to affect information use and problem identification. Finally, as was already pointed out, neither study measured selective perception in the most basic sense of whether subjects' perceptions were relatively broad or narrow.

This experiment was designed to assess the impact that experimental

methods had on the results and conclusions (Latham, Erez, & Locke, 1988) of two important studies. It also makes two other contributions: (1) we investigated the breadth, as well as the direction, of perceptions and (2) we uncovered evidence that people may exhibit selective *im*perception, in which functional experience tends to direct attention away from stimuli in some unrelated areas, rather than toward stimuli in areas related to their functional experience.

MODEL AND HYPOTHESES

To clarify the underlying conceptual differences between the two replicated studies and our study, we developed a causal model for each. All are presented in Figure 1.

Dearborn and Simon tested only the direct relationships between departmental affiliation[1] (expressed largely in functional terms) and selective perception (measured by areas of problems identified), as shown in Figure 1a. Their conclusions, however, mentioned company-wide or departmental "viewpoint" as a possible unmeasured mediating variable (1958: 142–143).

Following this lead, Walsh (1988) developed and tested the model given in Figure 1b. He postulated that past experience shapes belief structures that in turn channel selective perception. However, he reported statistical tests of only the relationship between belief structures and perceptions.

To be consistent with the aims of systematic replication, we developed a more comprehensive model (Figure 1c). Our model includes the two direct relationships central in the theorizing of the two earlier studies. In addition, it includes interactions that represent differences in the experimental procedures in the two studies, testing (1) whether observational goals (representing differences in instructions) interact with Dearborn and Simon's sole predictor variable (functional experience) in predicting selective perception and (2) whether this variable and salience (representing possible priming) interact with Walsh's primary predictor (belief structure) in predicting selective perception.

We present further justifications for each of the relationships in the model in discussions appearing before or after each hypothesis. Paths in the model are numbered to correspond to the hypotheses.

The two central direct paths in the models used in the two prior studies predict the following:

> *Hypothesis 1a. The greater the experience of decision makers in a functional area, the more that functional area will be represented in their belief structures.*

> *Hypothesis 1b. The greater the experience of decision*

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[1] Although Dearborn and Simon measured current affiliation, their discussion of "selective perception as a learned response stemming from some past history" (1958: 140) indicates that they expected this measure to include experience as well as current status.

FIGURE 1
A Comparison of Models Employed in the Two Earlier Studies and the Present Study
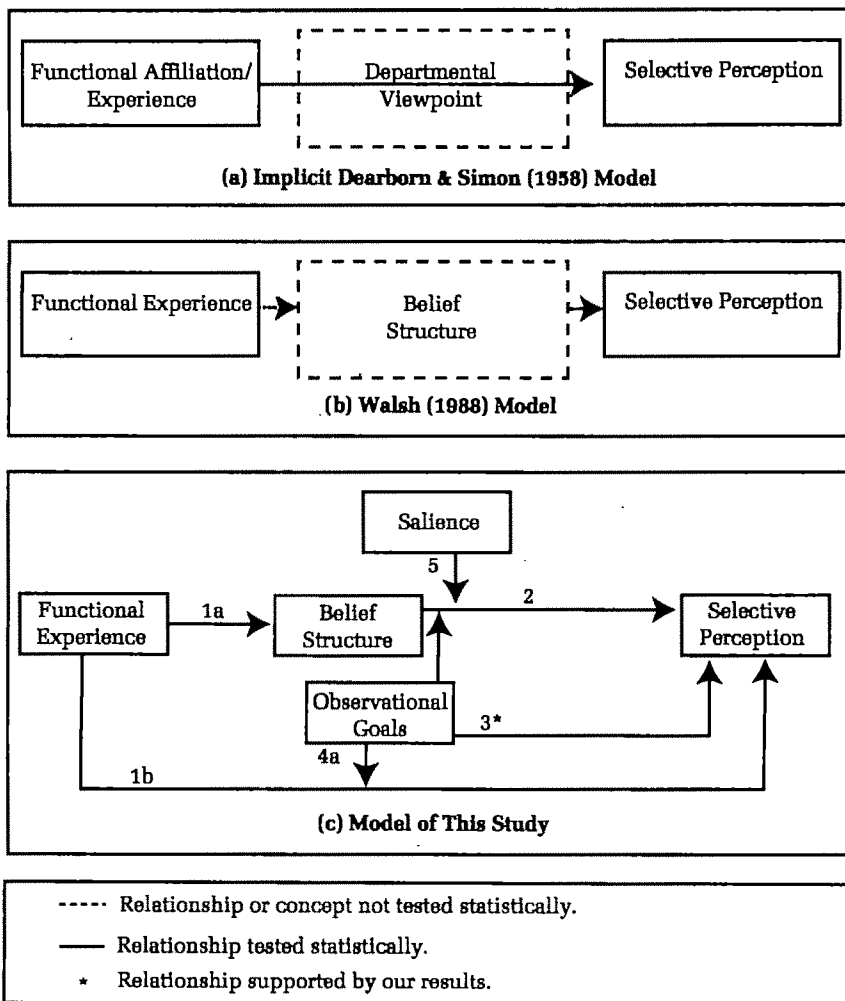
(a) Implicit Dearborn & Simon (1958) Model

(b) Walsh (1988) Model

(c) Model of This Study

----- Relationship or concept not tested statistically.

—— Relationship tested statistically.

* Relationship supported by our results.

> makers in a functional area, the more that functional area
> will be represented in their perceptions.

Because they are intended to replicate past findings, as already discussed, both of these predictions clearly refer to the *direction* of perceptions. The purpose of Hypothesis 1a is to address a gap in Walsh's analyses. Hypothesis 1b is intended to replicate the major finding of Dearborn and Simon's study.

Walsh measured subjects' perceptions by the types of information they sought and used and the problems they identified in analyzing a case. He found only marginal support for the relationship between belief structures and problems identified and scattered relationships between belief struc-

tures and information used and sought. Many researchers, however, have theorized that people use schemata, or cognitive maps, to simplify complex stimuli and thus channel their perceptions (DeNisi, Cafferty, & Meglino, 1984; Kiesler & Sproull, 1982; Prahalad & Bettis, 1986; Weick, 1979). Since null or weak results are not definitive, we used the following hypothesis to again test these ideas concerning the *direction* of perceptions:

> *Hypothesis 2. The more decision makers' belief structures emphasize a functional area, the more that functional area is likely to be represented in their perceptions.*

As already mentioned, a major difference between the Dearborn and Simon and the Walsh studies was the instructions given to subjects. Instructions by experimenters can set observational goals (Devine, Monteith, Zuwerink, & Elliot, 1991; Neuberg, 1989; Pavelchek, 1989). Dweck and Leggett suggested that different goals stimulate different response patterns of cognition, affect, and behavior, leading decision makers to approach ill-structured situations with "different concerns, asking different questions, and seeking different information" (1988: 260). It follows that a goal of identifying a single, important issue will evoke different, probably simpler and more restricted, information processing than will a goal of identifying multiple problem issues:

> *Hypothesis 3. The more restricted the observational goals of decision makers, the more selective their perceptions will be.*

Unlike our other hypotheses, this hypothesis predicts selective perception in terms of the *narrowness or breadth* of perceptions.

Also, by encouraging more filtering, the goal of identifying a single issue may amplify the effects of experience and belief structures on information seeking and problem identification. One explanation for such an effect would be that people seek to economize on their cognitive efforts. If asked to look at one problem, the problem that is easiest for them to identify may be the one most closely related to their functional backgrounds.

> *Hypothesis 4a. The more restricted the observational goals of decision makers, the more likely that their functional experience will be reflected in their perceptions.*

> *Hypothesis 4b. The more restricted the observational goals of decision makers, the more likely that their belief structures will be reflected in their perceptions.*

These hypotheses again concern the direction of perceptions.

The other experimental factor relevant to our replication was the possible priming that Walsh gave his subjects by having all of them respond to his measure of belief structure *before* they performed the experimental task that produced measures of their perceptions. Priming occurs when people's attention is directed to certain stimuli that are relevant to what they are then expected to do. It has been consistently shown to affect how people perceive

and process information (Fiske, 1993; Squire, Knowlton, & Musen, 1993). Similarly, the recency with which people have been reminded of associated ideas or information (Hoch, 1984; Tversky & Kahneman, 1974) has been posited to affect the retrieval of relevant information and schemata. More recent stimuli are more salient. Furthermore, the salience of a particular cue or set of cues tends to give salience to the categories or set of categories to which those cues are relevant (Ilgen & Feldman, 1983)—in this case, to functionally related categories. It thus seems appropriate to conceptualize and test the issue of priming in the Walsh study in terms of salience:

> *Hypothesis 5. The more salient decision makers' belief structures are, the more likely it is that their belief structures will be reflected in their perceptions.*

This hypothesis also concerns the *direction* of perceptions.

The five sets of hypotheses presented above serve to comprehensively test the implications of the arguments advanced and the procedures used in the two earlier studies. By including interactions as well as direct relationships, we addressed questions that might arise about both indirect and direct effects of all our hypothesized predictor variables. By including hypotheses that address two operational definitions of selective perception, we sought to be comprehensive in investigating the concept itself and in testing the theory that has developed around it.

Although Dearborn and Simon (1958) suggested that "selective attention to part of a stimulus reflects a *deliberate ignoring* of the remainder as irrelevant to the subject's goals and motives" (1958: 140, emphasis ours), neither they nor Walsh explored this possibility. Although we did not develop hypotheses to test this speculation, we considered it an important issue and therefore explored it with additional analyses.

METHODS

Procedures

Individual subjects reported to a designated room where two or more of the researchers explained the experiment and passed out packets of experimental materials. After signing a consent form, all subjects received the following tasks to perform: analyzing a case (the same one Walsh used), completing a questionnaire-type instrument measuring their belief structures, and completing a brief questionnaire that measured their work experience and other demographic characteristics and contained a manipulation check. The sequence of tasks each subject was to perform was indicated by numbered envelopes that contained the instructions and instruments for each part of the experiment.

As subjects analyzed the case, they were told to underline relevant information and were given one of two sets of instructions reflecting differences in the two earlier studies: to replicate Dearborn and Simon's (1958: 141) instructions, we asked some subjects to "read this case with an eye

toward identifying *the most important problem* facing the Arbor Company," and to replicate Walsh's (1988: 878) instructions, we asked other subjects to "read this case with an eye toward identifying *all of the important problems* facing the Arbor Company." Subjects filled out the other instruments included in the packet either before or after analyzing the case, according to the condition to which they had been assigned.

Subjects were thus randomly assigned to one of four conditions on the basis of both the number of problems they were asked to identify and the order in which they performed the tasks. The four conditions were: (1) single problem, case first, (2) single problem, case after measure of belief structure, (3) multiple problems, case first, and (4) multiple problems, case after measure of belief structure. Subjects were debriefed on the true nature of the experiment after all had completed their tasks; we then paid them and asked them not to discuss the experiment with others.

Subjects

The two earlier studies used executive students as subjects. Subjects participating in this study were 137 regular full-time master's of business administration (M.B.A.) students recruited at a large southwestern university; 120 of them provided complete data. Each was offered ten dollars for participation. None were currently enrolled in the researchers' classes. They were told that they would be participating in an experiment in managerial decision making and assured of the confidentiality of their responses.

The subjects had the following demographic characteristics: 87 were men (72.5%), and 33 were women (27.5%). Their average age was 28.06 years. They had an average of 4.71 years of work experience. Thirty-four (28.3%) expected their first job after finishing the M.B.A. program to be in finance or accounting; 33 (27.5%) expected it to be in marketing or sales; 1 (0.81%), in personnel and human resources; 9 (7.5%), in production and operations; 8 (6.7%), in information systems; 3 (2.5%), in R&D; and 23 (19.2%), in general management. Seventeen subjects (14.2%) were foreign nationals.

Measurements

Functional experience. We asked subjects how many years they had worked and then asked them to divide their total work experience by percentages into management areas, which we collapsed into seven categories: finance and accounting, human resources, production and operations, information systems, marketing and sales, research and development, and general management. The measures of specific functional experience used in our analyses were the percentages of work experience in each of these categories.

In his replication, Walsh (1988) used a global measure of functional diversity that assessed the extent to which managers had varied functional experience rather than experience in a single functional area. We did not use this measure to test hypotheses regarding the direction of perceptions be-

cause the theory suggested that experience in specific functional areas would be related to beliefs and perceptions in the same or related functional areas.

Walsh's measure did, however, seem suitable for testing our hypotheses about the breadth of selective perception. Consequently, we also constructed a global measure of the breadth of functional experience that assessed the extent to which respondents had varied functional experience or functional experience in a single area. The measure, based on Walsh's (1988) formula for his functional diversity measure, is as follows:

$$Breadth = \sqrt{\Sigma(x_i/X)^2},$$

where x_i is the number of years worked in a particular functional area and X is the total number of years of work experience.

Belief structure. Because Walsh (1988) found that only 2 out of 15 relationships were marginally significant when analyzed with his measure of belief structure, we decided to try a different way of measuring them. We modified and further developed somewhat simpler measures (Glick, Miller, & Huber, 1993) that assessed (1) the importance executives assign to 17 operative goals suggested by the work of Quinn and Rohrbaugh (1983) and (2) their cause-effect beliefs regarding the efficacy of each of 22 business tactics taken from the work of Porter (1980) and of Robinson and Pearce (1988). Because this measure was not specifically designed to reflect functionally related belief structures, we extended the initial 30 items to include an additional 28 items[2] focused on functionally related beliefs. Respondents were asked either (1) "In your opinion, how important is it for business firms to maximize __?" or (2) "How important is it for managers of business firms to pay attention to the following __?"; all responses were on seven-point Likert scales anchored by 1, "not very important," and 7, "very important." Together, the new and old items measured the same functional areas we measured for functional experience.

We factor-analyzed these items to see if the data supported our a priori expectation that belief structures are organized along functional lines. We used a common factor model with oblique rotation (Mulaik, 1972) because we expected that dimensions of belief structures would be correlated. A six-factor solution with 27 items produced distinct factors for finance and accounting, human resources, production and operations, information systems, marketing and sales, and research and development. The interitem reliabilities (Cronbach alphas) for scales based on these factors ranged from .64 to .83. We used these scales in hypotheses testing the *direction* of selective perception.

Observational goals. Observational goals were manipulated in the case

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[2] These items were generated by a group of researchers with different functional backgrounds following observations of ten groups of M.B.A. students discussing an integrative strategic management case.

analysis packet. On the cover sheet for the case and on the response forms, subjects were instructed to identify either "*the* most important problem" in the case or "*all* of the important problems" in the case.

The last envelope for all subjects contained a manipulation check. Subjects were asked the extent to which they agreed or disagreed with the following three statements (1) "I was only looking for the most important problem area," (2) "I noticed many more problems than I was asked to identify," and (3) "The instructions constrained the thoroughness of my case analysis." Significant differences were observed between the two experimental conditions for each of the three items ($t = 2.5$, $p < .01$; $t = 7.14$, $p < .0001$; $t = 4.16$, $p < .0001$). As an additional way of checking the manipulation, we also examined whether subjects who were asked to identify the most important problem reported fewer problems than subjects who were asked to identify all the important problems. The analysis showed that subjects in the single-problem condition identified significantly ($t = 5.32$, $p \leq .001$) fewer problems than subjects in the multiple-problem condition.

Salience of beliefs. Salience of beliefs was manipulated by the order in which subjects were instructed to perform tasks. Those in the beliefs-salient condition filled out the belief structure instrument before analyzing the case; the other subjects filled it out after analyzing the case.

Selective perception. Two indicators of selective perception were used in our analyses: information attended to and problems identified.[3] Both were coded, according to instructions obtained from Walsh (1992 personal communication), into the same five functional areas he used: finance and accounting, human relations, external management, marketing, and internal management. Although his categories do not exactly match the seven functional areas of experience we measured, they are quite close. We used his categories because we wanted to replicate his measures of perceptions as closely as possible.

Two of the researchers trained cooperatively to use his classification scheme (Walsh, 1988: 879) until they had reached acceptable levels of reliability. Subsequent to this training, the two coders independently coded the complete set of cases for the indicators of selective perception. Interrater reliabilities, calculated as intraclass correlation coefficients (ICC [2,k]; Shrout & Fleiss, 1979), were as follows: for information sought, .78; for information attended to, .98; and for problems identified, .91.

As discussed earlier, selective perception can be conceptualized in terms of either (1) the general narrowness or breadth of perceptions or (2) whether perceptions are directed toward information related to functional experience. Our analyses employed four measures of the *narrowness/breadth* of perceptions: the total amount of information subjects attended to (i.e., the number of segments of text underlined), the number of functional

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[3] Measures of information sought, a third indicator used by Walsh, were also collected. The only significant results for this variable were with observational goals, and we therefore excluded it from further consideration in this study.

areas in which they attended to information, the total number of problems they identified (i.e., the number of different problems identified), and the number of functional areas in which they identified problems. We also used ten measures of the *direction* of perceptions, counting how much information subjects attended to and how many problems they identified in each of the five functional areas used by Walsh. We then used logarithmic transformations of the number of problems in each area and of the total number of problems in all areas to adjust for the skewness of the data and to reduce the effect of extreme scores on those variables.

Analyses

Part canonical correlations were used as initial omnibus tests for hypotheses with multiple independent and dependent variables (Hypotheses 1a, 1b, 2, 4a, 4b, and 5) dealing with the direction of perceptions. Using regression analyses to test all of these hypotheses would have inflated the experiment-wide error rate beyond acceptable limits. For example, the canonical correlation analysis for information attended to on functional experience included seven measures of functional experience and five measures of information attended to in specific functional areas. The analyses of interactions of observational goals with functional experience included seven interactions of functional experience with observational goals on the same five measures for information attended to. By providing omnibus tests, the canonical correlations helped us identify sets of independent and dependent variables whose relationships merited further investigation with regression analyses.

We then used regression analyses to further test relationships that had produced significant relationships in the part canonical correlations. These regression analyses thus served as the tests of those hypotheses that could not be rejected on the basis of the canonical results. First, we used regression analyses to test relationships between specific areas of functional experience and specific areas of information attended to or specific areas of problems identified. These analyses investigated results relevant to the hypotheses concerning the direction of perceptions. We did the regression analyses in two ways. The first was to analyze the relationship between logically related areas of functional experience and perception in order to determine if specific functional experience directed attention toward related areas of information. In other cases, where such an obvious correspondence did not exist, we made judgments regarding which specific functional experience related to which specific area of problems identified or information attended to. For example, we related functional experience in marketing and sales and in research and development with problems identified and information attended to in external management. In other analyses, we related functional experience in information systems, general management, production and operations, and finance and accounting with problems identified and information attended to in internal management. All of these analyses controlled for the effects of observational goals.

Second, we examined the relationships between all areas of functional experience and all areas of problems identified and information attended to. We thus relaxed the assumption that selective perception tends to focus on only those areas in which people have had experience. This set of regression equations let us explore another possibility—namely, that functional experience directed cognitive processing away from certain areas, rather than focusing it on certain areas.

To test Hypothesis 3, predicting that the narrowness or breadth of perceptions will be a function of observational goals, we used multiple regression analyses. In these analyses, we also controlled for the effects of functional experience because it represented the competing explanation, according to theory, for selective perception.

RESULTS

As indicated in the Methods section, we tested Hypotheses 1a, 1b, 2, 4a, 4b, and 5 in two stages. First, we used canonical correlation to weed out clearly nonsignificant relationships. Second, we further tested relationships that were significant in the canonical results with more detailed regression equations. The significant results of both of these sets of analyses were rather scattered and thus are reported only in the text that follows.

The results of the canonical correlation analyses for Hypotheses 1a and 1b were somewhat mixed. Specific areas of functional experience were not significantly related to specific beliefs (Hypothesis 1a; part adjusted $r_c^2 = .00$). We concluded that Hypothesis 1a was not supported. This result is consistent with results reported by Walsh. Although he did not test this relationship statistically, his visual inspection showed no evidence for this relationship in his data.

Results of the canonical correlation analyses indicated, however, that type of functional experience was significantly related to both types of selective perception—information attended to (part adjusted $r_c^2 = .09$, $p < .05$) and problems identified (part adjusted $r_c^2 = .10$, $p < .05$), tentatively supporting Hypothesis 1b. To test this hypothesis fully, however, we needed to employ regression analysis to uncover the specific relationships underlying these overall significant effects.

When we paired subjects' areas of functional experience with the expected direction of their perceptions—that is, with logically related areas of information attended to or problems identified[4]—we found no significant

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[4] Specifically, we examined whether (1) finance and accounting functional experience was related to finance and accounting problems identified and finance and accounting information attended to, (2) human resource work experience was related to human relations problems identified and information attended to, (3) R&D and marketing work experience was related to external management problems identified and information attended to, (4) marketing work experience was related to marketing problems identified and information attended to, and (5) functional experience in information systems, general management, production and operations, and finance and accounting was related to problems identified and information attended to in internal management.

relationship for information attended to. For problems identified, we found a few scattered significant relationships: relevant functional experience was significantly related to problems identified in the area of internal management—specifically, subjects with greater production/operations or finance/accounting experience were significantly more likely to identify internal problems than were other subjects. In total, 18 relationships were tested, with only the 2 reported above found to be significant.

Despite these predominantly null results, we wanted to guard against committing a type II error. We therefore calculated the statistical power of these regression equations for small-to-medium effect sizes (Cohen, 1988), setting alpha equal to .10. On the basis of these results, we relaxed the probability of a type I error (i.e., falsely rejecting the null hypothesis) to .12 to reduce the probability of falsely accepting the null hypothesis to .05. This adjustment resulted in one more variable being a significant predictor: finance and accounting experience had a significant, negative effect on subjects' identifying finance and accounting problems. This further result was inconsistent with Hypothesis 1b, and given that the other regression results obtained were too scattered to exceed what might be expected by chance, we concluded that our data also failed to support Hypothesis 1b.

Furthermore, results in the canonical analyses for Hypothesis 2 offered no support for a connection between belief structures and the direction of perceptions reflected in either information used or problems identified. In his study, Walsh (1988: 885) found only scattered support for the relationship between belief structure and problems identified.

Table 1 gives results for tests of Hypothesis 3, concerning the narrowness or breadth of perceptions when the breadth of functional experience is controlled. Observational goals clearly had major effects on how subjects analyzed these cases, particularly in terms of problem identification. Subjects who were asked to identify multiple problems attended to more information in more areas and identified more problems in more areas. These

TABLE 1
Results of Regression Analyses of Predictor Variables on Breadth of Perceptions[a]

Predictor Variable	Information Attended To		Problems Identified	
	Total Amount	Number of Areas	Total Number	Number of Areas
Observational goals[b]	.18*	.22**	.53***	.70***
Breadth of functional experience	.03	.00	−.07	−.08
R^2	.03	.05*	.30***	.51***
Adjusted R^2	.02	.03*	.29***	.51***

[a] Standardized regression coefficients are shown. Degrees of freedom = 3, 119.
[b] With 1 = narrow, 2 = broad.
 * $p < .05$
 ** $p < .01$
 *** $p < .001$

TABLE 2
Results of Regression Analyses of Direction of Perceptions on Areas of Work Experience and Observational Goals[a]

Independent Variables	Finance and Accounting		Human Resources	
	Information Attended To	Problems Identified	Information Attended To	Problems Identified
Finance and accounting experience	−.03	−.27[†]	−.26[†]	−.20
Human resources experience	−.07	−.22	−.17	−.06
Research and development experience	.07	−.05	.06	−.06
Production and operations experience	−.03	.08	−.25	−.18[†]
Information systems experience	.03	−.30***	−.06	−.11
General management experience	.15	−.05	−.01	−.02
Marketing and sales experience	.01	−.12	−.34*	−.27*
Observational goal	.24**	.32***	.17[†]	.50***
Adjusted R^2	.04	.19***	.08*	.26***

[a] For all models, $df = 7, 115$. Standardized regression coefficients are shown.
  [†] $p < .10$
  * $p < .05$
  ** $p < .01$
  *** $p < .001$

results clearly support the hypothesis. Surprisingly, the breadth of functional experience did not predict the breadth of perceptions, either for information attended to or for problems identified.

We also conservatively tested Hypotheses 4a, 4b, and 5, which predict interactive effects, by examining part canonical correlations controlling for the main effects of either functional experience or belief structures. None of the hypothesized interactions were found. Neither observational goals nor salience significantly interacted with either functional experience or belief structures to affect the direction of perceptions as measured by information attended to or problems identified (part adjusted r_c^2 ranged from .02 to .17). The interactions of salience and belief structure were also not significant (part adjusted $r_c^2 = .08$ and .02).

The above results are summarized, with supported hypotheses starred, in Figure 1c. Findings supported only Hypothesis 3.

Switching to an exploratory mode, we next assessed the relationships between all areas of functional experience and all areas of cognitive processing with another set of regression analyses. These results (Table 2) show a surprising lack of correspondence between experience and cognitive processing in the same functional area. Only in finance and accounting were experience and problems identified related, and then only at a marginal level of significance. Furthermore, the relationship is not positive, as theory predicts, but negative. Other significant relationships pair logically unrelated types of information or problems with specific areas of functional experience. Also telling is that most (7 of 9) of these marginally significant relationships are negative.

Since only 9 of the 70 tests of significance involved produced significant results with $p < .10$, one interpretation of these results is that they are chance

TABLE 2 (continued)

External Management		Marketing		Internal Management	
Information Attended To	Problems Identified	Information Attended To	Problems Identified	Information Attended To	Problems Identified
.09	.04	.23	−.05	−.01	.08
.05	.02	.09	−.09	.07	−.11
.07	.01	.25*	.06	.01	−.03
−.09	.00	.04	.08	−.18	.18
.15	−.23*	.07	−.09	.00	−.07
.05	−.10	.27*	−.08	.04	.04
.04	.01	.15	−.06	−.12	−.08
.14	.51***	.17†	.66***	.14	.43**
.00	.21***	.04	.40***	.01	.18**

relationships. We again conducted a power analysis to decide whether we had adequate statistical power in the regressions reported in Table 2 to detect medium-sized effects. For problems identified, the power analysis indicated that we had adequate power to detect relationships. For information attended to, although the power analysis indicated that only with an alpha value of .80 would we have sufficient power to detect the hypothesized effects, we did obtain several significant results.

If we accept these scattered results as nonrandom, they show that functional experience tends to focus cognitive processes away from some unrelated areas, rather than direct attention to related areas. For example, subjects with information systems experience identified fewer problems in both finance and accounting and in external management than other subjects. Similarly, marketing and sales work experience did not significantly predict attention to information in the marketing and sales area, but it did have a significant, negative impact on the information attended to in the area of human resources. Production and operations experience was also negatively related to the information attended to and problems identified in human resources. More puzzling are the results for finance and accounting experience, which is negatively related at the .10 level both to the problems identified in finance and accounting and to the information attended to in human resources. The only positive relationships are for the marketing information attended to, which is positively related to research and development experience and general management experience. Again, there is no obvious match between experience and perceptions.

Table 2 also provides more specificity on the effects of observational goals on the direction of perceptions in all functional areas. The results show that observational goals both influenced the number of problems identified in all functional areas and influenced the information attended to for finance and accounting, human resources, and marketing.

DISCUSSION

The purpose of this study was not only to see which of the results from the Dearborn and Simon (1958) and the Walsh (1988) studies could be rep-

licated, but also to extend those studies by investigating more fully the links between functional experience, belief structures, and selective perception. To that end, we added observational goals and salience of belief structure as additional predictors in our study to represent methodological factors that could have affected subjects' information processing and problem identification in the prior two studies. We also investigated possible interactions of the main predictor variables and measured selective perception by both the breadth and direction of subjects' information processing.

As might be expected in a study that assesses a comprehensive model of all possible relationships, our results did not support all our hypotheses. None of the interactive effects hypothesized in the model were found. In particular, the salience of belief structures created by possible priming effects did not have significant interactive effects on selective perception. The other aspect of experimental procedures investigated (namely, differences in instructions to subjects in the two replicated studies) did, however, have significant main effects. Our results showed clearly that observational goals embodied in these instructions had direct effects on the breadth of perceptions—that is, on the amounts and type of information attended to and the amounts and type of problems identified. Individuals who were encouraged to think of multiple problems (as in the Walsh study) identified more problems and attended to more information than individuals whose assigned goal was to identify a single problem (as in the Dearborn and Simon study). Thus, we must conclude that the differences between the results of the two earlier studies are at least partially attributable to methodological differences—specifically, to how many problems subjects were encouraged to identify.

Further analyses—in which we decomposed work experience, information attended to, and problems identified by functional area—revealed that experience predicted only a few areas of information attended to or problems identified. Although these results are scattered, they are interesting in that logically related areas of work experience did not predict problems identified or information attended to. Rather, unrelated areas of experience tended to predict both problems identified and information attended to, suggesting that functional experience does not increase managers' attention to related information but instead tends to restrict the areas of information to which they pay attention. These suggestive findings support the general conclusion that has been drawn from the Dearborn and Simon results, that managers' functional experience tends to narrow their cognitive processing. Our findings differ, however, from the usual interpretations of selective perception that posit functional experience as directing attention to rather than away from related areas of information. In particular, they are consistent with Dearborn and Simon's speculations about selective attention leading to people's ignoring some stimuli.

Much of the literature on perception seems to rest on the assumption that the cognitive processes that draw attention to a stimulus and those that draw attention away from a stimulus are the same. Discussions often treat

perception as a process in which the blocking of the perception of some stimuli automatically directs greater attention to others. Researchers use terms like perceptual filters (Starbuck & Milliken, 1988) and blind spots (Porter, 1980; Zajac & Bazerman, 1991) to argue that more attention is directed to some stimuli than to others. Usually, it is argued that the stimuli to which perceivers devote more attention are those that are consistent with existing schemata or familiar in terms of the perceivers' past experience (Day & Lord, 1992; Hambrick & Mason, 1984; Kiesler & Sproull, 1982), especially when the stimuli are complex or ambiguous (Bruner, 1957). It seems to follow from these arguments that perceivers will tend to ignore, forget, or discount information that is discrepant with existing beliefs (Kiesler & Sproull, 1982). The attending-to and not-attending-to processes are thus assumed to be two sides of the same general process.

Although it is sparser, some literature has specifically addressed the issue of why people may fail to perceive—the process we have called selective *imperception*. In perhaps the most comprehensive treatment, Kiesler and Sproull (1982) summarized a variety of situational reasons why people may not attend to certain information: (1) the information may not meet a threshold or aspiration level for what they need or expect—it may be deemed inadequate, (2) they may already have detected related information that they expect to serve their purposes, (3) other, competing information may be more salient, (4) the strength of the signal for the information may be relatively weak, or (5) the category into which the information appears to fall may be inconsistent with what they are seeking (Fiske & Newberg, 1990; Fiske & Taylor, 1991). Bayster and Ford (1995) suggested that managers tend to ignore information that does not fit the way they have classified a problem in terms of functions within their firms and associated characteristics of decision making in those functions. Other possibilities are that managers think they can rely on others' expertise in the areas to which they are not attending (Melone, 1994), or their attending to certain categories of information in the past has not been reinforced (Brunderson & Sutcliffe, 1995), or their accountability for the decision is low (Fiske, 1993).

All of these suggested reasons for selective *im*perception are largely external to perceivers and thus do not directly address what is happening within them. Most of these reasons are not relevant to the experimental situation used in this experiment or the previous studies it replicated. Only the second and fifth reasons given above seem to have plausibility in a situation in which M.B.A. student subjects are working alone to solve an unfamiliar case. Also, all of these suggested reasons for *im*perception apply to the direction of perceptions, and not to the question of their general breadth.

Another possibility, one that seems more applicable in an experimental situation such as we used, is that some process that is internal to the person doing the perceiving leads to selective *im*perception. We found two theoretical explanations in the literature for such an internal process: the elimination of aspects (Tversky, 1972) and the switching of cognitive gears (Louis

& Sutton, 1991; White & Carlston, 1983). In the first, the narrowing of individuals' perceptions operates more by their eliminating single aspects (Tversky, 1972) they consider peripheral than by their focusing on matters they consider central. Such an explanation is consistent with Walsh's contention that managers are not such selective perceivers as had been thought. They may keep a reasonable range of options open and eliminate options one at a time rather than attend to only a few aspects that fit prior beliefs. This explanation is consistent with most of the negative relationships found in Table 2.

The third possibility is that people switch between actively attending to schema-consistent and schema-inconsistent information (White & Carlston, 1983). When confronted with complex stimuli, they tend to look, in what is called controlled information processing, for schema-consistent information first. Once they have confirmed their schemata, they turn their attention away from schema-consistent information to schema-inconsistent information, but continue to monitor schema-consistent information in an automatic, less demanding process. It therefore seems possible that managers may pay less attention to information consistent with schemata derived from their functional experience after an initial period in which they have attended to enough of that information to confirm their functional schemata. It also seems possible that they may need relatively little information to confirm their schemata. Such a process would explain our results from finance and accounting, in which the subjects with the most experience in these fields paid less attention to information in these areas. These arguments, however, also seem to address the direction of perceptions more than they address their breadth.

Although the explanations offered above may also pertain to the breadth of perceptions to a degree, they are undoubtedly not the whole story. It seems likely that the internal dispositions or traits of a perceiver also affect perceptions. One such trait that bears examination is cognitive complexity. In an experimental mode, we included cognitive complexity in this study and found it had strong effects on the breadth of perceptions.[5] Thus, an especially promising avenue for addressing the breadth of perceptions in future research would be to further explore the effects of cognitive complexity on selective perception or *im*perception and to work at identifying other individual dispositions that seem likely to affect how broadly or narrowly people perceive.

Walsh's (1988) study and this study considered three aspects of selective perception: the direction of information sought, the information attended to, and the problems identified. We did not find any consistent

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[5] Cognitive complexity was also positively related ($p < .10$) with information attended to in four areas, and with problems identified in two areas. Inclusion of cognitive complexity increased most of the adjusted R^2s predicting the direction of perceptions but did not change the general pattern of results for the effects of work experience and observational goals. These results are available from the first author.

effects of belief structures on any of these measures. There are at least two possible reasons why: First, there may actually be no such effects. Walsh also failed to find consistent relationships between belief structures and the direction of perceptions. Second, it may be extremely difficult—perhaps impossible—to measure belief structures adequately (Rosman, Lubatkin, & O'Neill, 1994). Although it is appealing to posit a belief structure that channels problem identification and the cognitive processing of information, neither we nor Walsh (1988) were able to demonstrate such a relationship using two different sets of carefully developed measures.

In addition, this study yielded strong direct effects of observational goals on the breadth of perceptions. At least in experiments, people's perceptions of problems and information are responsive to instructions.

Like the studies replicated, this study derives both strengths and limitations from its research method, a controlled but contrived experimental situation. A strength of the present study that the earlier studies lacked is that we employed experimental controls that enabled us to test the theory underlying the selective perception construct more comprehensively and rigorously than the past studies had done. This type of research cannot, however, determine whether practicing managers behave like our research subjects when actually making crucial decisions.

In addition, our subject pool differed somewhat from that of the replicated studies in years of managerial experience. We cannot be sure how many years of experience their subjects had. Dearborn and Simon only described their subjects as "executives," and Walsh's subjects averaged 38 years of age while ours averaged 28 years. Despite these differences, however, our results are actually quite similar to those of the earlier studies. Like Dearborn and Simon, we found functional experience was sometimes related to the types of problems subjects identified. However, in our results nonsignificant relationships were so much more numerous than significant ones that we were forced to conclude that our results were equivocal at best and did not give clear evidence for these relationships. Also, like Walsh, we failed to find a link between belief structures and functional experience and found only scattered relationships between belief structures and information processing. Furthermore, his and our subjects identified similar numbers of problems (means were 7.12 and 7.47, respectively) and attended to similar numbers of pieces of information (means were 25.09 and 20.76, respectively).[6] Thus, it seems unlikely that differences in status and age between our subjects and his produced any differences in effects between the two studies. The main difference between our results and his are the strong and

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[6] In addition, we explicitly tested the possibility that an M.B.A. education affected subjects' responses by looking for differences in our results between first- and second-year students in our sample. The first-year students participated in this experiment before their classes began, during orientation week. The second group participated in the last semester of what is usually a two-year program. There were no significant differences in results as a whole between the two classes of students.

consistent effects of a methodological factor (observational goal) we controlled. Observational goals not only help to explain the differences in the results of the two earlier studies but, as other research has suggested, seem likely to influence the information processing of managers regardless of experience. A second difference is that our study uncovered evidence of selective *im*perception, which could not be detected by the statistical procedures used in the prior studies. Thus, we do not know whether or not *im*perception was present in the managerial samples of respondents they used.

CONCLUSIONS

The results of Dearborn and Simon's (1958) study of selective perception produced a widespread belief among management scholars that managers are selective information processors. Our results suggest that managers' information processing is somewhat influenced by their functional experience, but not necessarily in the ways previously theorized and investigated. Furthermore, the cognitive path through which such influence might occur remains to be demonstrated. M.B.A. students with managerial work experience exercised selective perception when constrained by the observational goals given them, but they were more catholic information processors when their observational goals called for a broader perspective. When their functional experience did influence their information processing, it was more likely to direct that attention *away* from unrelated areas of information than toward related areas, suggesting that managers may narrow their perceptions through selective *im*perception.

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DIVERGENT EFFECTS OF JOB CONTROL ON COPING WITH WORK STRESSORS: THE KEY ROLE OF SELF-EFFICACY

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This study identifies job self-efficacy as a moderating variable that may determine whether job control contributes positively or negative to coping with work stressors. Data from two samples (health professionals and an occupationally diverse group) demonstrated similar interactions between demands, control, and self-efficacy predicting blood pressure. These results may reconcile the previous inconsistent and largely method-bound support for Karasek's job demands–control model and suggest that efforts to improve job self-efficacy may be as important to reducing the cardiovascular consequences of job stress as efforts to enhance control.

Organizations lack feasible means to reduce job stress exposures that are widely believed to have negative health consequences. Thus, the primary goal of organizational epidemiology in recent years has been to identify the conditions under which given job stressors can be implicated in the development of serious health problems. Drawing on a preponderance of laboratory research and a few field successes, writers have widely asserted that a lack of job control is the cause of poor individual coping with job stress and resultant health disorders. Karasek's (1979) job demands–control model (also known as the decision latitude model), which contains this proposition, "has provided the underlying theoretical basis for most large scale studies of job stress conducted in the last ten years" (Fox, Dwyer, & Ganster, 1993: 290). However, support for this model has been mixed at best.

In this article, we review research and theory suggesting that the demands–control model contains the assumption that jobholders have a high level of self-efficacy. Further, we suggest that control may even have adverse health consequences among those low in self-efficacy. Below we develop an extension of Karasek's (1979) model that predicts workers' resting blood pressure levels with a three-way interaction between demands, control, and

self-efficacy. We tested this new model on a sample of health professionals and then replicated the findings with a more occupationally diverse sample.

THEORETICAL BACKGROUND

The Job Demands–Control Model

Presenting the job demands–control model, Karasek posited that physiological strain results "from the joint effects of the demands of a work situation and the range of decision making freedom (discretion) available to the workers facing those demands" (1979: 287). The model contains two primary predictions. First, job strain increases as job demands increase. Second, if the challenges of a job can be matched by an incumbent's ability to cope actively with those challenges (i.e., the job is high in control), appropriate behavior patterns that lead to an effective channeling of arousal occur. Thus, high-demand, high-control jobs are termed "active" and seen as not only less conducive to stress outcomes, but also as potentially leading to health improvement via anabolic processes. However, if demands are high and control is low (a "high-strain" job), arousal is not appropriately channeled and high strain is maintained. Additionally, if both demands and control are low, a job is defined as "passive," which means the job provides little opportunity for its incumbent to cope directly with job demands. Karasek, Russell, and Theorell (1982) described the mediating physiological processes (identified in animal studies) that make demands and control particularly related to cardiovascular functions such as blood pressure.

Most of the large-scale tests of Karasek's (1979) model have utilized cardiovascular outcomes. Support for the model has been mixed. In four studies,[1] researchers applying the model have predicted cardiovascular disease and myocardial infarction (e.g., Schnall et al., 1990) as well as systolic and diastolic blood pressure (e.g., Fox et al., 1993); findings regarding one of five job stressors supported the model in the latter study. Eight studies, however, have failed to support the model in results on blood pressure or other cardiovascular outcomes (e.g., Albright, Winkleby, Ragland, Fisher, & Syme, 1992). As Fox and colleagues (1993) and Landsbergis, Schnall, Warren, Pickering, and Schwartz (1994) noted, the epidemiological studies supporting the model have not explicitly tested the interaction between demands and control. Instead, they have combined demands and control data into subgroups or obtained a demands-control ratio and then correlated this with cardiovascular outcomes. Because the main effects of demands and control were not controlled for, these tests of the demands-control interaction have been inappropriately liberal. As Ganster and Fusilier concluded from their review, "The evidence for an interactive effect of control with job stressors is relatively weak" (1989: 262).

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[1] A full list of these studies as well as the eight studies mentioned below is available from the authors.

The Role of Self-Efficacy

The inconsistent findings of tests of the job demands–control model may be explained by the presence of one or more unmeasured variables in the interaction. Most job stress theories acknowledge the influence of domain-specific individual differences on the relationship between job demands and health. Although Karasek (1979) suggested that individual differences may play a role in the function of job control, direct tests of the demands–control model have not addressed such variables.

As defined by Wood and Bandura, "Self-efficacy refers to beliefs in one's capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands (1989: 408). Control perceptions capture an individual's appraisal of an objective situation (Ganster, 1989b), whereas self-efficacy is dispositional in that it measures the individual's evaluation of his or her personal ability to exercise that control. As discussed by Bandura (1986: 440–442) and Gist and Mitchell (1992: 196–198), the dispositions leading to perceived control and self-efficacy are commonly influenced by individual differences (state and trait) as well as by objective situations. Both appraisals may be distorted perceptions of actual control and efficacy. The subjective perceptions of demand, control, and self-efficacy are the primary mediators of stress reactions.

Litt (1988a) suggested that self-efficacy is critical because it affects an individual's ability and willingness to exercise control: "Judgments of self-efficacy may be such that the control provided is not useful or may even have a negative effect. Control may benefit only those who are confident that they can use it and that it will be effective. . . . In this way, then, perceptions of control in a situation and estimates of self-efficacy to use that control to advantage interact to determine how a person will appraise the situation and how much distress will be elicited" (Litt, 1988a: 253). According to Litt, people with high self-efficacy, having confidence in their ability to exercise control, should have better behavioral and psychological outcomes in high-demand, high-control situations than do people with low self-efficacy. The latter "may experience enhanced distress, possibly anxiety, if forced to assume control that they feel unprepared to use" (Litt, 1988a: 254). Litt (1988b) supported these predictions in a laboratory study of pain tolerance.

Averill's (1973) classic review of human and animal studies of control and stress noted that a sizable minority of subjects found control to be stress inducing rather than stress reducing. According to Averill, poor (or inefficient) use of control "might increase the stressfulness of a situation by providing negative feedback to the subject" (1973: 293) about his or her competence. The authors of several published laboratory studies have observed that control had aversive physiological consequences at higher levels of task difficulty (see the review by Öhman and Bohlin [1989]). Task difficulty is expected to negatively influence self-efficacy (Bandura, 1986; Gist & Mitchell, 1992). As Öhman and Bohlin stated, "Persons may perceive that events are controllable, yet completely disregard the implications of this perception

because they judge the relevant coping response as lacking from their behavioural repertoire" (1989: 261). Likewise, Fisher (1984: 229–235) reviewed evidence from a range of stress studies to suggest that *lower* control in difficult situations may reduce the stressfulness experienced by people with low self-efficacy because it enables them to make situational (versus self-directed) attributions for difficulties and failure, thereby protecting their self-esteem.

The provision of control may have salutary health effects, consistent with the demands-control model, among workers who perceive high levels of self-efficacy in relation to their job behaviors. Under these conditions, job control can be effectively utilized in coping with work stressors. As Wortman and Dunkel-Schetter (1979) suggested, high self-efficacy may likewise be *harmful* when an individual lacks control over outcomes (as with cancer treatment). People may become discouraged when their efficacy beliefs are challenged by the objective uncontrollability of a situation. These authors found that high-self-efficacy cancer patients, who expected effective control over their lives, blamed themselves for their deteriorating physical condition.

The Present Study

The research reviewed above supports Karasek's (1979) job demands–control model, but only among people who experience a sense of high self-efficacy in their jobs. Among people low in job self-efficacy, increasing control may exacerbate the stress of demanding jobs (Litt, 1988a). Bandura (1977: 84–85) noted that self-efficacy beliefs can be generalized beyond individual tasks. Recent research indicates that dispositional variables such as job self-efficacy, "interpersonal self-efficacy," "activities self-efficacy," and "coping self-efficacy" are reliable and valid predictors of behavior (e.g., Widenfeld, O'Leary, Bandura, Brown, Levine, & Raska, 1990). The dependent variables in the present research were systolic and diastolic blood pressure. High blood pressure is always in the top three predictors of cardiovascular disease in major population-based studies of cardiovascular risk. Cardiovascular disease is the leading cause of death and health care costs in the United States. Hypertension also leads to a multitude of other health problems, including stroke (the third leading cause of death among older adults) and kidney disease (Kaplan, 1986). There is a monotonic relationship between blood pressure and mortality. "Life expectancy decreases as blood pressure rises . . . . The higher the level of either systolic or diastolic blood pressure, the greater the risk of developing target organ disease secondarily" (McMahon, 1984: 3). Even mild chronic elevations of these factors are related to later cardiovascular disorder and cardiovascular disease–related mortality (cf. Baubiniene, Klumbiene, & Miseviciene, 1983).

The research and theory suggesting an interactive relationship between self-efficacy, control, and demand perceptions (Averill, 1973; Fisher, 1984; Litt, 1988a; Öhman & Bohlin, 1989) suggest the following general hypothesis and two specific hypotheses:

> *Hypothesis 1. The three-way interaction between per-ceived job demands, control, and self-efficacy will be sig-nificantly related to systolic and diastolic blood pressure.*

> *Hypothesis 1a. At higher levels of self-efficacy, job de-mands will have a more positive relationship with systolic and diastolic blood pressure among subjects reporting lower control.*

> *Hypothesis 1b. At lower levels of self-efficacy, job de-mands will have a more positive relationship with systolic and diastolic blood pressure among subjects reporting higher control.*

In addition to testing the general and specific hypotheses, in further analyses we examined the extent to which differences in job titles predicted self-efficacy and the job perceptions of control and demands. We estimated com-mon characteristics of the job titles included in this study from independent samples using two nationwide U.S. databases, the Position Analysis Ques-tionnaire (PAQ; McCormick, Jeanneret, & Mecham, 1972) and the *Dictionary of Occupational Titles* (DOT; Miller, Treiman, Cain, & Roos, 1980). Corre-lating the perceptual measures with PAQ and DOT job ratings provided a test of the extent to which job features common to all workers sharing the same job title could explain job perceptions.

METHODS

Sample and Procedure

Data were collected on site at a large rehabilitation hospital located in the midwestern United States. The hospital provided comprehensive ser-vices in physical therapy, occupational therapy, speech therapy, psychologi-cal services, and other services for severe trauma patients. The sample con-sisted of 110 full-time health professionals involved in the daily adminis-tration of patient care. This sample represented 42 percent of the hospital's total workforce and 86 percent of the direct patient care workers who were the target of this study. A questionnaire was administered to each subject during his or her regularly scheduled work shift. Seventy-seven (77) direct patient care workers provided complete data on their demographic charac-teristics, blood pressure, and perceived job control, self-efficacy, and de-mands. Thus, the effective response rate was 60 percent. The mean position tenure among workers in this analysis sample was 3 years, 11 months, and the subjects averaged 15.2 years of education and 37.4 years of age. Ninety percent (90%) were women.

Measures

Self-report items were used to measure diastolic and systolic blood pres-sure. Thomas and Ganster (1995) and Fox and colleagues (1993) also had health professionals self-report their blood pressure, and the resulting data

indicated this was a reliable method to obtain blood pressure information. Fox and colleagues reported high internal consistency reliabilities among multiple measures taken at home and at work as well as high test-retest correlations between the home and work measures.

For all other measures, Likert-type scales were utilized. We adapted the Sherer, Maddux, Mercandante, Prentice-Dunn, Jacobs, and Rogers (1982) general self-efficacy scale to measure job self-efficacy. There were 11 items (for instance, "I am confident in my ability to perform the functions of my job") measuring job self-efficacy ($\alpha = .83$).

Ganster's (1989a) 22-item control instrument ($\alpha = .83$) measured job control. The items asked subjects how much control they possessed over various facets of their jobs (e.g., "How much control do you have personally over the quality of your work?"). The items in this instrument are similar to the "decision latitude" items used by Karasek and his colleagues; a number of items in the latter instrument (Karasek, 1979), however, have low face validity for control and may in fact measure job complexity (Ganster, 1989a: 256–257; Wall, Jackson, Mullarkey, & Parker, 1996).

Perceived job demands were measured by an adaptation of the Caplan, Cobb, French, Harrison, and Pinneau (1975) job complexity instrument. This scale contained 17 items ($\alpha = .89$) addressing the work pace, complexity, conflict, and ambiguity involved in carrying out a job.

We obtained independent measures of job complexity and job control using information from the Position Analysis Questionnaire (PAQ; McCormick, Jeanneret, & Mecham, 1972) and the fourth edition of the *Dictionary of Occupational Titles* (DOT; Miller, Treiman, Cain, & Roos, 1980). PAQ Services provided data from PAQ surveys of 6 to 72 positions scored by at least two raters for each of the nine job titles. PAQ reports with low interrater reliability were not utilized. These survey data are distinguished by 194 job elements and 45 global dimensions. The elements are based on item averages, whereas the dimensions represent cumulative factors that are weighted on the basis of historical data from nearly 40,000 jobs (cf. PAQ Services, 1990).

The PAQ provided a 16-element "job complexity" scale ($\alpha = .96$), and we computed a "substantive complexity" factor from DOT ratings (Miller et al., 1980). Substantive complexity is a composite of worker function dimensions. We also examined a variety of PAQ dimensions that related to job demands and one that measured degree of job structure.

Self-reports of gender and age were used as control variables representing the risk of high blood pressure. A review of the various literatures addressing the model variables did not identify other common correlates of the focal variables whose omission would bias the analyses. Nearly all subjects in this study were Caucasian, and thus race was effectively controlled.

RESULTS

The correlations among the central analysis variables and the demographic risk factors were consistent with previous research. Gender was

significantly correlated with both systolic and diastolic blood pressure ($p < .05$), with men having higher blood pressure. Job self-efficacy was negatively correlated with job demands and positively correlated with control. Control and demands were not correlated with blood pressure. Workers providing complete data did not differ on the control variables from those with missing data on any of the three job factors (age, $t_{103} = 0.38$, $p < .71$; gender, $t_{107} = 0.09$, $p < .93$; and job tenure, $t_{104} = 0.52$, $p < .61$).

We conducted multiple regression analyses to test the interaction of self-efficacy, perceived job control, and perceived job demands with diastolic and systolic blood pressure separately dependent (see Table 1). At the first step, we entered the main effects of age, gender, and job tenure. For systolic blood pressure, this block of variables was significantly predictive ($R^2 = .13$, $F_{3, 73} = 3.49$, $p < .02$), whereas the block was marginally predictive of diastolic blood pressure ($R^2 = .09$, $F_{3, 73} = 2.29$, $p < .085$). At step 2, we entered

TABLE 1
Results of Regression Analyses[a]

Variable	Systolic Blood Pressure		Diastolic Blood Pressure	
Step 1				
Gender	−12.94*	(−16.8)**	−8.73*	(−11.4)**
Age	0.29*	(0.27)*	0.14	(0.1)
Job tenure	0.00	(−0.0)	0.01	(−0.0)
R^2	.13		.09	
$F_{3, 73}$	3.5*		2.3	
Step 2				
Job demands	−0.04	(−373.9**)	−1.91	(−252.8**)
Control	−1.81	(−537.5**)	−0.77	(−324.7*)
Self-efficacy	2.89	(−288.1**)	−0.64	(−198.6**)
ΔR^2	.03		.01	
$F_{3, 70}$	0.72		0.35	
Total R^2	.15		.10	
Step 3				
Job demands × control	−5.73	(130.1**)	−3.83	(77.1*)
Job demands × self-efficacy	5.07	(70.9**)	8.28*	(47.6**)
Control × self-efficacy	−0.75	(100.6**)	−0.72	(61.1*)
ΔR^2	.02		.07	
$F_{3, 67}$	0.54		1.81	
Total R^2	.17		.17	
Step 4				
Job demands × control × self-efficacy	−24.49**		−14.6*	
ΔR^2	.11		.07	
$F_{1, 166}$	9.68**		5.90*	
Total R^2	.28		.24	

[a] $N = 77$. Numbers in parentheses are the unstandardized coefficients at step 4.

* $p < .05$

** $p < .01$

the main effects of perceived job demands, control, and self-efficacy. This block was not predictive of either systolic or diastolic blood pressure. The three two-way product terms were entered at step 3. This block did not approach significance for either type of blood pressure, and none of the individual interaction terms was significantly associated with blood pressure. Thus, these data did not support the job demands–control model.

In step 4, we entered the three-way interaction between perceived job demands, control, and job self-efficacy. In support of the central hypothesis, the three-way interaction was significant with systolic blood pressure dependent ($\Delta R^2 = .11$, $F_{1, 66} = 9.68$, $p < .003$). The hypothesis was also supported with diastolic blood pressure dependent ($\Delta R^2 = .07$, $F_{1, 66} = 5.90$, $p < .018$). We plotted the three-way interactions by inserting high (one standard deviation above the mean) and low (one standard deviation below the mean) values for the three variables into the regression equation and then drawing the constituent two-way (perceived job demands by control) interactions for both high self-efficacy and low self-efficacy. In support of Hypothesis 1a, the job demands–control model was supported among workers who reported *high* self-efficacy. Job demands were more positively related to systolic and diastolic blood pressure among workers lower on control. Among those with *low* self-efficacy, demands were positively related to blood pressure when control was higher, supporting Hypothesis 1b (see Figures 1 and 2).

We constructed job title dummy variables to provide contrasts between the different jobs in the sample. The block of nine dummies was not significantly related to perceived control ($R^2 = .16$, $F_{8, 60} = 1.47$, $p < .19$). Job contrasts were strongly related to self-efficacy ($R^2 = .38$, $F_{8, 60} = 4.63$, $p < .0002$) and perceived job demands ($R^2 = .26$, $F_{8, 60} = 2.70$, $p < .013$). These results suggest that self-efficacy and job demands, but not perceived control, may be a function of job characteristics common to incumbents of the same job, not just idiosyncratic perceptions and experiences.

The PAQ and DOT variables that were expected to represent job complexity correlated significantly with the perceived job complexity (or job demands) measure used to test the hypotheses. The PAQ Job Complexity and DOT Substantive Complexity factors, which are commonly used in research, correlated strongly with each other ($r = .90$) as well as with perceived job complexity ($r = .53$, PAQ; $r = .57$, DOT). The posited job control measures from the PAQ, however, did not correlate with each other or with perceived control. In conjunction with the job title contrasts discussed above, these results suggest that common characteristics affect individual job complexity and job self-efficacy perceptions. However, the correlations are not high enough to suggest that individual experiences play a lesser role in these perceptions. Job control perceptions, on the other hand, were again found to be more idiosyncratic to job incumbents.

We attempted to replicate the central findings using a sample consisting of 214 employees of a large contracting firm in the midwestern United States. These workers were surveyed and interviewed as part of a larger study. Diastolic and systolic blood pressure were measured as the mean of three

FIGURE 1
Interaction between Job Demands and Control Predicting
Diastolic Blood Pressure[a]
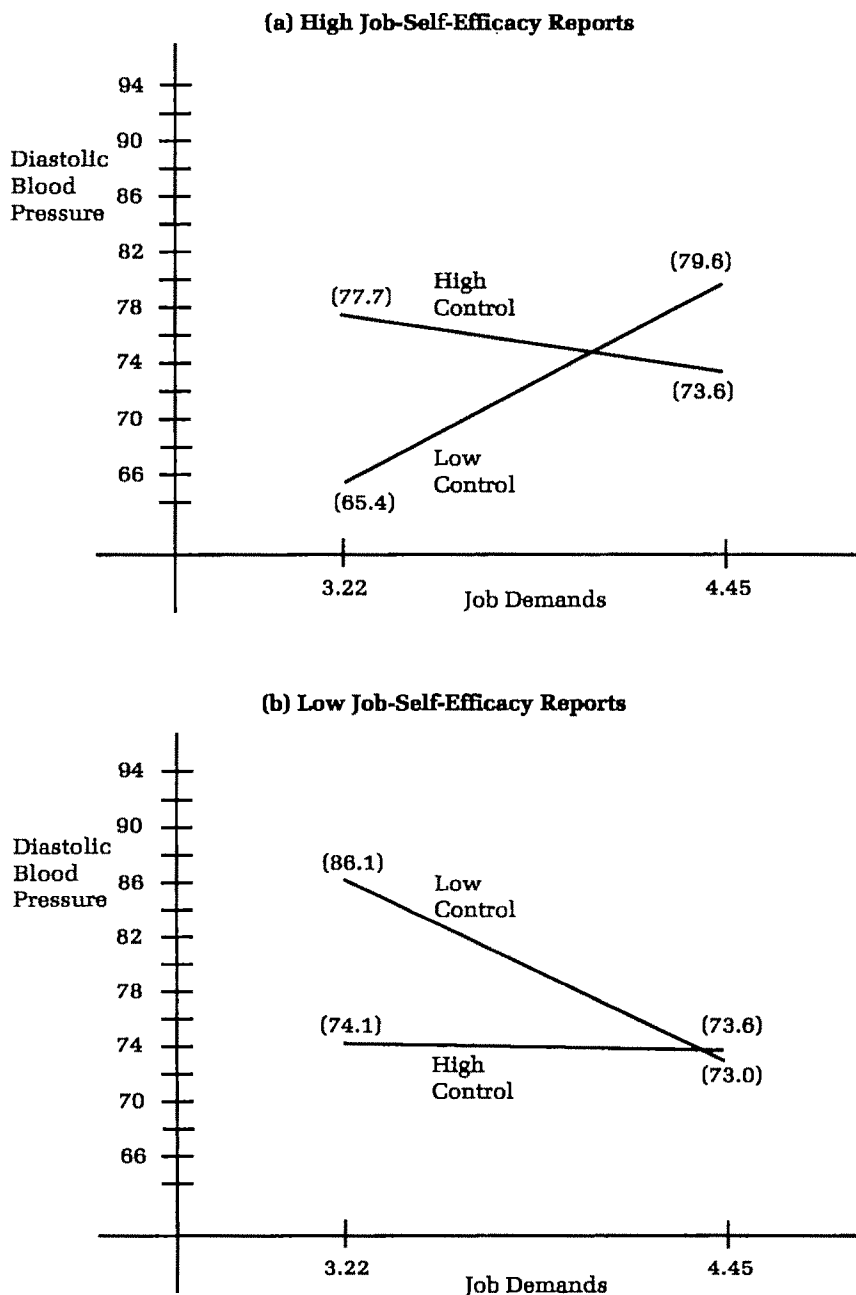
(a) High Job-Self-Efficacy Reports

(b) Low Job-Self-Efficacy Reports

[a] The value for high job self-efficacy was 6.17; low job self-efficacy was 4.67. High control was 3.39; low control was 2.24.

FIGURE 2
Interaction between Job Demands and Control Predicting
Systolic Blood Pressure[a]
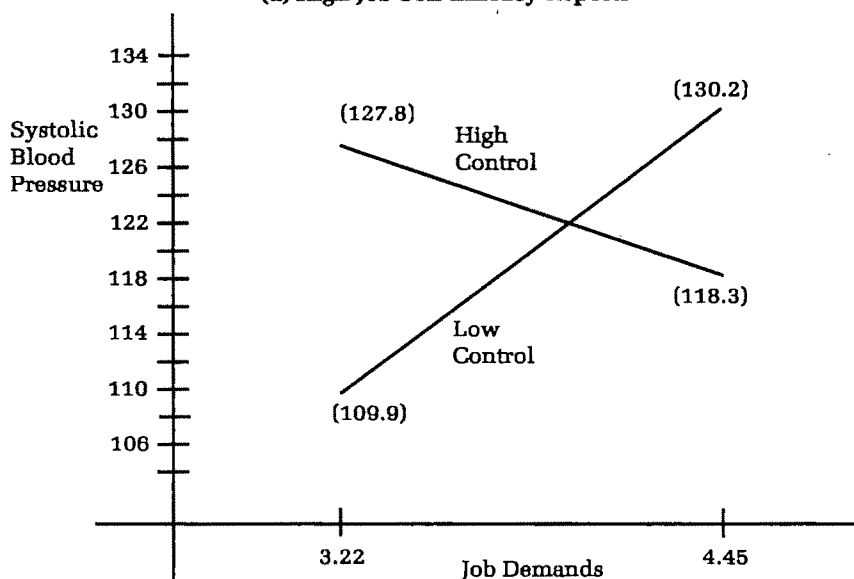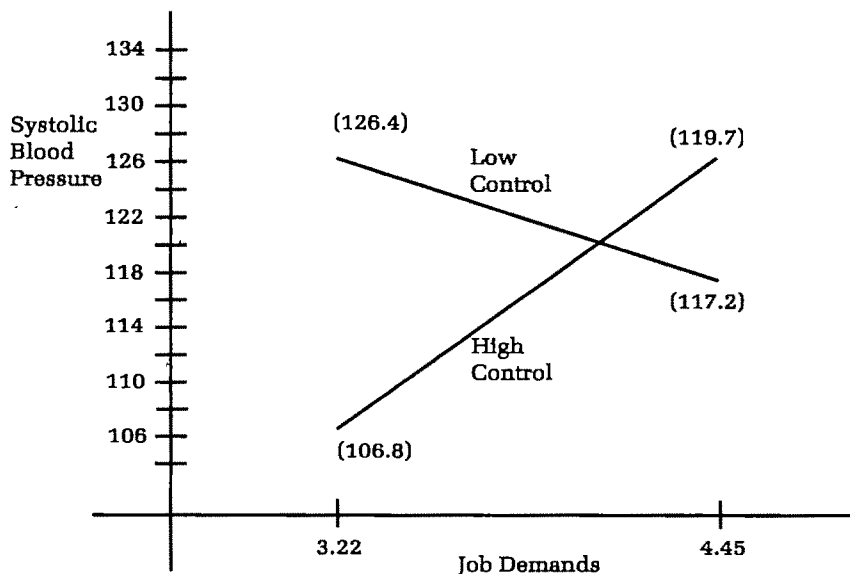
(a) High Job-Self-Efficacy Reports

(b) Low Job-Self-Efficacy Reports

[a]The value for high job self-efficacy was 6.17; low job self-efficacy was 4.67. High control was 3.39; low control was 2.24.

resting measures taken at six to seven minute intervals just prior to administration of a stressful task. Correlations among the diastolic blood pressure readings ranged from .80 to .88, and those among the systolic blood pressure readings ranged from .78 to .88. These measures were obtained by a trained member of the research team using an IBS SD-700 Digital Monitor. Individual difference control variables included body mass index (weight [kg]/height [cm^2]), lack of aerobic exercise, gender, and age. Other possible risk factors, including cigarette smoking, caffeine consumption level ([number of cups of coffee + number of cups of tea] + [.5 × number of cans of caffeinated soda]), and type A behavior, did not correlate significantly with blood pressure; we observed that these risk factors had negligible influences on the results when they were included in post hoc regression analyses. Control was measured using the 16-item original form of Ganster's (1989a) instrument, and the DOT dimension, "direction-control-planning," provided an independent, job analysis–based assessment of control. The work stressor measures were developed by Caplan and colleagues (1975). These included quantitative workload, responsibility for others, lack of co-worker social support, lack of supervisor support, DOT substantive complexity (Miller et al., 1980), and psychological job complexity (Hackman & Oldham, 1975). The average correlation among these work stressor measures was .08. Self-efficacy was measured by proxy, combining the following two items reflecting activity-related self-confidence: "I am able to do things as well as most other people" (1 = strongly disagree, 5 = strongly agree) and "Choose a letter which describes where you fall on the scale. . . ." (A[1] = not at all self-confident, E[5] = very self-confident).

The first model was an omnibus test of the interaction hypotheses. This test included the main effects of the control variables (age, gender, body mass, exercise) and the theoretical variables (12 in all), all two-way interactions (13 in all), and the 6 three-way [work stressor by control by self-confidence) interactions. The main effects of the 6 work stressors were not significant for diastolic ($\Delta R^2 = .03$, $F_{6, 169} = 0.91$, $p < .49$) or systolic ($\Delta R^2 = .01$, $F_{6, 169} = 0.34$, $p < .92$) blood pressure. In addition, the blocks of two-way interactions were not significant for diastolic ($\Delta R^2 = .05$, $F_{13, 156} = 0.77$, $p < .69$) or systolic ($\Delta R^2 = .02$, $F_{25, 156} = 0.33$, $p < .99$) blood pressure. Thus, the job demands–control model was not supported. The hypothesized three-way interactions were significant for both diastolic ($\Delta R^2 = .15$, $F_{6, 150} = 6.17$, $p < .00001$) and systolic ($\Delta R^2 = .09$, $F_{6, 150} = 3.57$, $p < .003$) blood pressure.

Examined individually, 7 of the 12 three-way interactions were statistically significant, and all but 2 (responsibility for others and supervisor social support) of the 6 job stressors were predictive of at least one blood pressure index in three-way interaction with control and self-confidence. Each of the constituent two-way (work stressor by control) interactions was consistent with Hypotheses 1a and 1b. The three-way interaction involving DOT substantive job complexity predicting diastolic blood pressure, which is representative of the overall pattern, is shown in Figure 3. (A detailed description of these results is available from the first author.)

FIGURE 3
Interaction between DOT Substantive Job Complexity and Control Predicting Diastolic Blood Pressure[a]

(a) High-Self-Confidence Reports

(b) Low-Self-Confidence Reports
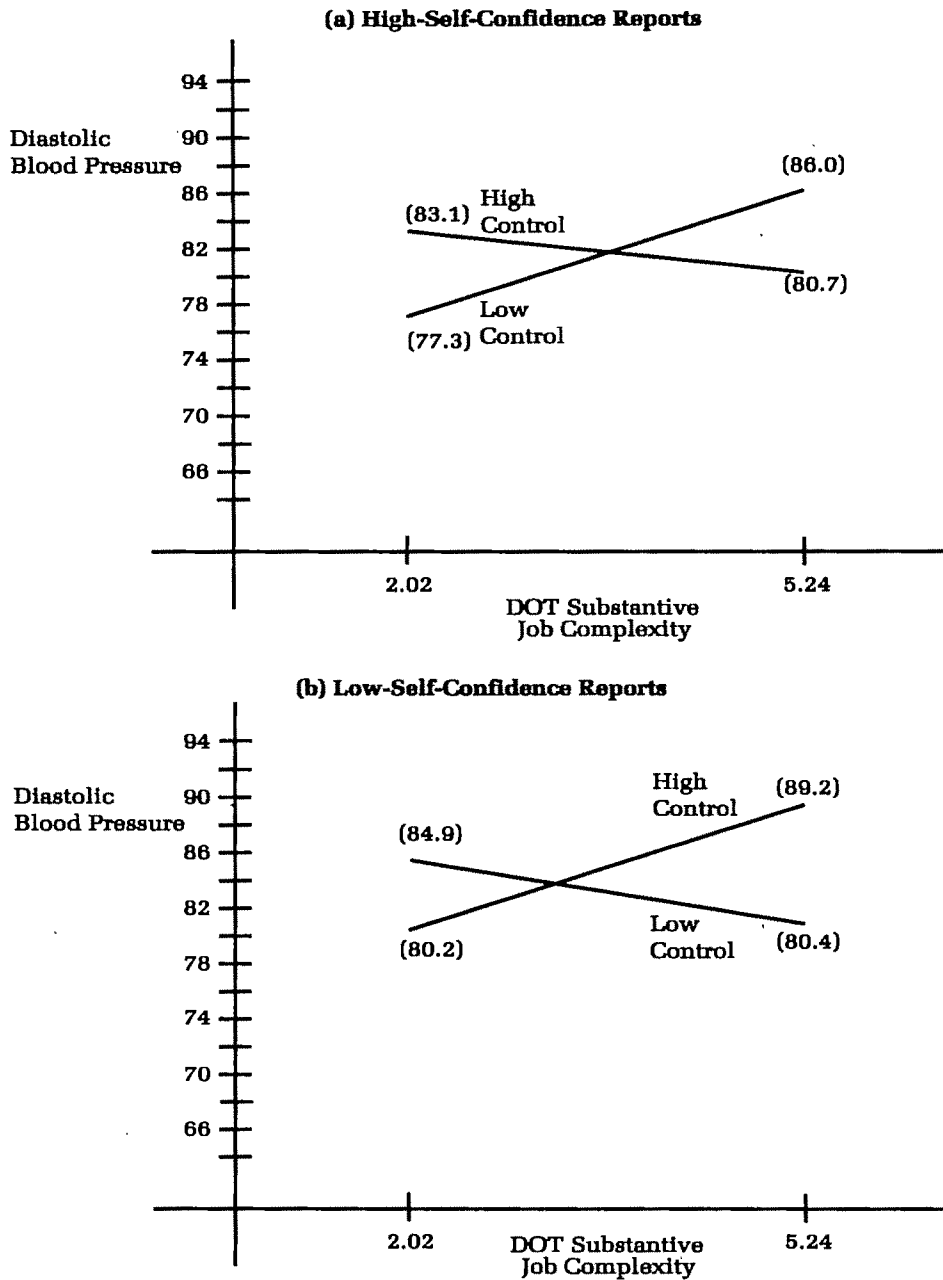
[a]The value for high self-confidence was 4.63; the value for low self-confidence was 3.37. High control was 3.49, and low control was 1.93.

DISCUSSION

In these data, self-efficacy proved to be a determinant of the form of the interaction between job demands and control predicting blood pressure. Among those high in self-efficacy, the results matched predictions for the demands-control model. When people are confident in their abilities, having control mitigates the stress consequences of demanding jobs. A lack of control may be particularly harmful for people with high self-efficacy in demanding circumstances because uncontrollable situations may challenge personal agency perceptions. Such people are more likely than others to blame themselves for an inability to cope with demands. Consistent with Litt's (1988a) theorizing, however, high control combined with high job demands had negative health consequences among those reporting lower self-efficacy. People who are not confident in their mastery over job content may be distressed by the greater responsibility for dealing with demands that stems from control. When control is low, however, the environment may be seen as controlling outcomes, and for these workers, demands will not have as strong an effect on cardiovascular symptoms. In fact, demands were negatively related to blood pressure among people low in self-efficacy reporting low control conditions. These results were essentially replicated in a secondary data analysis of a more occupationally diverse sample that included multiple work stressor measures. If self-efficacy had not been included as a moderator in these analyses, this would be yet another study that failed to support the demands-control interaction.

Field interventions founded on the job demands–control model focus on increasing job control. At least for the present sample, such efforts will likely reduce stressfulness only among individuals who experience a high level of mastery in their jobs. Low-self-efficacy people may suffer even more after increases in control. Thus, raising self-efficacy may be just as important as increasing control to reducing the cardiovascular effects of job demands. The self-efficacy literature provides a number of approaches organizations might use to raise workers' self-efficacy (cf. Gist & Mitchell, 1992). Gist, Schwoerer, and Rosen (1989) and Gist (1989) compared modeling with more traditional training approaches (e.g., lectures), and both studies found that behavior modeling was more effective at raising self-efficacy. Seligman (1991) researched and popularized an alternative approach to increasing efficacy that focuses on changing causal explanations for task outcomes. It is possible that workers' self-efficacy can be enhanced by training them to make internal, stable attributions for successes and external, unstable (or specific) attributions for failures and difficulties. Because the previous self-efficacy research indicates that such interventions increase skill acquisition and motivation, they are justified on practical grounds—even if the present findings, which indicate that such interventions may enhance worker well-being, are not considered.

As Ganster (1989b: 18–19) argued, workers must be aware of how much control is at their disposal if they are to cope effectively with job demands.

In this study, job title contrasts were unrelated to perceived control, and independent assessments of job control (using the PAQ) did not correlate with perceived control. According to Fox and colleagues, "The construct of most importance is an individual's personal belief in his or her control over a work situation. This meaning is clearly evident in Karasek's (1979) initial work and follows from an extensive body of work in experimental psychology" (1993: 291–292). Thus, managers implementing job redesign interventions designed to increase employee control in order to reduce health risks should be sure (1) that employees are confident of their abilities to utilize this control and (2) that each employee directly experiences the enhanced control. Employee involvement in job redesign may be essential for both purposes.

Control and job demands had no main effects on blood pressure, with only one exception in both sets of analyses. (Responsibility for others correlated significantly [$r = .15$, $p < .05$] with both blood pressure indexes in the replication sample, but the effect was no longer significant after addition of the control variables.) This observation is consistent with previous organizational research focusing on blood pressure as a dependent variable. Not 1 of 12 published tests of the demands-control model and blood pressure has reported job demand main effects on blood pressure. Many members of the medical research community do not consider stress to be a major precursor of hypertension. This view may be explained by the weak zero-order correlations of stress-related variables with blood pressure as well as the failed efforts to reduce blood pressure through stress management (Hypertension Prevention Collaborative Research Group, 1992; Markovitz, Matthews, Kannel, Cobb, & D'Agostino, 1993). The present findings suggest that stress should be taken more seriously, depending on the specifics of each person's job situation. Thus, a more refined treatment of individual stress, one informed by the job stress literature, may aid in the identification of a proper course of treatment for high blood pressure.

Future studies might improve on the present one by examining larger, more occupationally diverse samples in order to increase the variances of the variables (to obtain stronger effects) as well as to test the generalizability of the expanded model. However, self-efficacy may have different implications for different occupational groups, and thus separate analyses for different occupational groups may be needed. For example, having low job self-efficacy may have stronger implications among nurses and doctors than among college professors, because task failures have greater consequences for health practitioners. Self-efficacy may also be uniformly high among workers in simpler occupations.

Longitudinal data would be more useful for examining causal hypotheses. Ideally, data on the predictor variables would be collected prospectively, and then symptom data would be collected years later, as has been done in a few of the major tests of the job demands–control model (e.g., Alterman, Shekelle, Vernon, & Burau, 1994). Finally, additional cardiovascular outcomes, such as heart disease and arterial disorder, should be ex-

amined. The present study focused on blood pressure because it is a major predictor of cardiovascular disease, stroke, and kidney disease that has showed some cross-sectional variability in samples of working adults. Thus, we encourage further refinements in research models of work stress that represent attempts to explain how, and under what conditions, stress undermines health.

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